CCD-V6000E
RMT-500

AEP Model
UK Model
Australian Model
E Model

Hi8 PRO

SPECIFICATIONS

System

Video recording system	Rotary two heads, Helical scanning FM system
Audio recording system	Standard: Rotary head, FM system (2 channels) PCM: PCM system (2 channels)
Video signal	PAL colour, CCIR standards
Usable cassette	8 mm video format cassette
Tape speed	SP: Approx. 2.0051 cm/sec. LP: Approx. 1.0058 cm/sec.
Recording time	SP mode: 1 hour 30 min. LP mode: 3 hours (E5/P5–90)
Playback time	SP mode: 1 hour 30 min LP mode: 3 hours (E5/P5–90)
Fast forward/rewind time	Approx. 7 min. (E5/P5–90)
Image device	CCD (Charge Coupled Device)
Viewfinder	Electronic viewfinder (black and white)
Lens	Combined 10 × power zoom lens f=8 – 80 mm, F1.8 with macro Filter diameter: 52 mm
Auto focus system	TTL
Color temperature	Auto: One push white balance INDOOR 3,200 K OUTDOOR 5,800 K
Minimum illumination	3 lx (F1.8)
Illumination range	3 lx – 100,000 lx (0.3 – 9,294 footcandles)
Recommended illumination	More than 100 lx (9.3 footcandles)
Aperture correction	Automatic, manual (variable)

PCM

Sampling frequency	31.5 kHz
Audio frequency	20 Hz – 15 kHz
Dynamic range	More than 85 dB
Wow and flutter	Less than 0.005% RMS

Input and output connector

Video output	Phono jack (1), 1 Vp-p, 75 ohms unbalanced, sync negative

– Continued on next page –

- **SERVICE OF REMOTE COMMANDER RMT-500**

Remote commander RMT-500 is available as a unit. But as individual parts the battery case lid of commander is only avaiable.

MICROFILM

8 VIDEO CAMERA RECORDER

SONY®

S video output	4-pin mini-DIN Luminance signal: 1 Vp-p, 75 ohms, unbalanced, sync negative Chrominance signal: 0.300 Vp-p, 75 ohms, unbalanced
Audio output	Phono jacks (3: L, R and monaural), –7.5 dBs, loaded by 47 kilohms, output impedance less than 2.2 kilohms
RFU DC OUT	Special minijack, 5V DC
Video input	Phono jack (1), 1 Vp-p, 75 ohms, unbalanced, sync negative
S video input	4-pin mini-DIN Luminance signal: 1 Vp-p, 75 ohms, unbalanced, sync negative Chrominance signal: 0.300 Vp-p, 75 ohms, unbalanced
Audio input	Phono jacks (2: L, R), –7.5 dBs, input impedance more than 47 kilohms
Headphones jack	Stereo minijack, 8-ohm impedance
Remote jack	Stereo mini-minijack
Microphone jacks	External microphone jacks: phone jack (2), –66 dBs, low impedance External narration microphone jack: minijack, –66 dBs, low impedance

General

Power requirements	on the battery mounting surface 6.0 V (battery pack) 7.5 V (AC power adaptor)
Power consumption	12 W (camera recording)
Installation	Vertically, horizontally
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	–20°C to +60°C (–4°F to +140°F)
Dimensions	Approx. 190 × 235 × 430 mm (w/h/d) (7 1/2 × 9 3/8 × 17 in.) Including the lens hood
Weight	Approx. 3 kg (6 lbs 10 oz) excluding the battery pack, lithium battery,cassette, and jack cover Approx. 3.3 kg (7 lb 4 oz) including the battery pack NP-77H, lithium battery CR2025, cassette E5-90, and jack cover
Microphone	Electret condenser microphone ×2 uni-directional stereo type
Narration microphone	Electret condenser microphone, omni-directional monaural type
Accessories supplied	• Wireless Remote Commander (1) • R6 batteries (2) • Battery pack NP-77H (1) • AC power adaptor AC-V50 (1) • Lithium battery CR2025 (1) • Shoulder strap (1) • Jack covers* (1 set) • Lens cap (1) (Attached to the camcorder) • A/V connecting cord (3 phono to 3 phono) (1) • Video cable with S video connectors (4-pin mini-DIN to 4-pin mini-DIN) (1)

Design and specifications are subject to change without notice.

Note
This appliance conforms with EEC Directive 87/308/ EEC regarding interference suppression.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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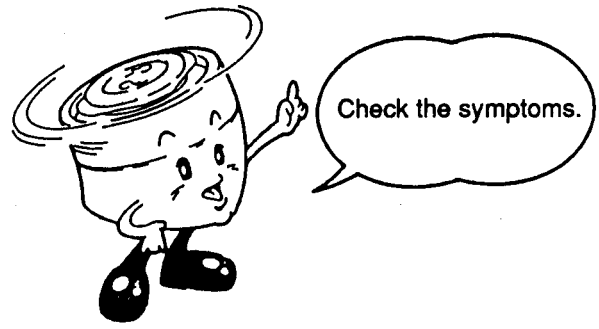
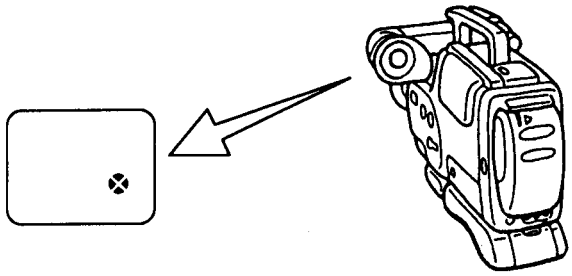
[CHECK FOR HEAD CLOGS AND REMEDY]

After an extended period of use the video image may become indistinct or may not appear at all during playback of a tape. The cause of this usually are dirty video heads. For remedy, cleaning of the heads is required.



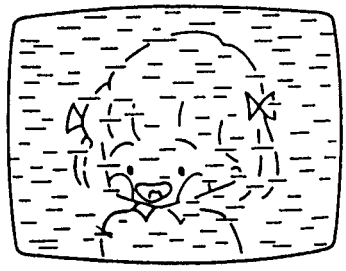
Check for Head Clogs During Recording

① Use a blank tape, record a short section, then press the stop button to stop.
② Set to recording mode again.
③ If the [⊗] mark is flashing in the viewfinder at this time, head clogs are occurred.



Check During Playback of a Tape

① Play back a pre-recorded tape and display the image on a TV screen.
② If there is no sound and the image is unstable, no image appears on the screen, or tape transport is unstable, head clogs are occurred.

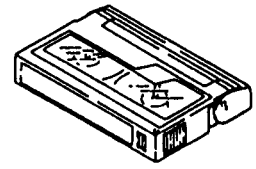


The state the image flickers by noise on the screen.

Remedy

[Cleaning method using a cleaning tape]

- Use the Cleaning Tape for Hi8. (Please follow the instructions attached to the cleaning tape.)



Technical Information

SECTION 1
GENERAL

This section is extracted from instruction manual.

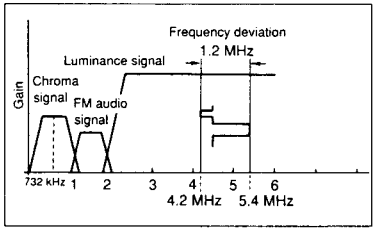
Hi8 (High Eight) Video System

The 8 mm video system employs a metal powder tape. This means the video camera recorder is capable of recording a large amount of information and enhances picture quality. Taking advantage of the 8 mm video system, the Hi8 video system has been developed. The main characteristics of the Hi8 video system are as follows:

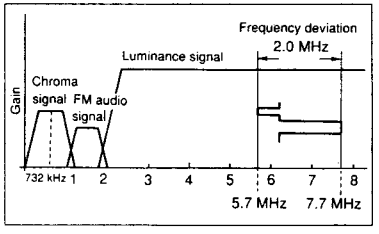
Super High Quality Picture

The information capacity is a key element for picture improvement. It can be increased by shifting up the FM carrier frequency range. In the Hi8 video system, the FM carrier frequency range of the luminance signal is shifted up to 5.7–7.7 MHz. This is higher than the 4.2–5.4 MHz range of the standard 8 mm video system. Thanks to this, the horizontal resolution is improved to more than 400 lines.

Frequency allocation of the standard 8 mm video system



Frequency allocation of the Hi8 video system



Compatibility with Conventional Video Camera Recorders

A high-quality picture can be recorded and played back on a tape for the Hi8 video system.

Recording with this unit

Hi8 tape **Hi8**

Hi8 mode switch to AUTO	Tape recorded in the Hi8 video system
Hi8 mode switch to OFF	Tape recorded in the standard 8 mm video system

Standard 8mm tape 8

Regardless of the position of the Hi8 mode switch	The recorded in the standard 8 mm video system

Recording with this unit

Tape recorded in the Hi8 video system Tape recorded in the standard 8 mm video system	The recording mode is selected automatically

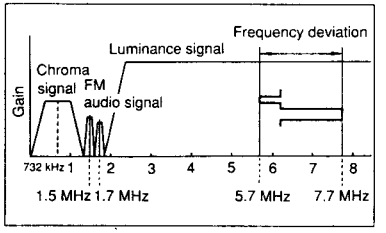
- A tape recorded in the Hi8 video system cannot be played back with an conventional 8 mm video camera recorder.
- A standard 8 mm tape 8 cannot be recorded in the Hi8 video system.
- A tape for the Hi8 video system **Hi8** cannot be recorded and played back in the Hi8 video system with a conventional video camera recorder.
- The recording tape speeds in the Hi8 video system are compatible with the conventional 8 mm format.
  Recording/playback time is 1.5 hours using a E5/P5-90 tape or the equivalent.

Cassette used	With this unit		
	Recording		Playback
	Hi8	Normal	
Standard 8 mm tape 8	No	Yes	Yes
Hi8 tape **Hi8**	Yes	Yes	Yes

Hi-Fi Stereo System

On the 8 mm video standard track the sound is recorded/played back in AFM hi-fi monaural. The PCM digital stereo sound is recorded/played back on the PCM track as an option.
On this unit, in addition to PCM digital stereo sound, the AFM hi-fi stereo sound can be recorded on the standard track.
To maintain compatibility with the conventional AFM hi-fi monaural sound, the AFM hi-fi stereo sound is recorded as the L–R sound using the 1.7 MHz carrier and the L+R sound using the 1.5 MHz carrier as the FM audio signal.
To play back the tape recorded by its hi-fi stereo system, this unit uses a matrix circuit to produce the L and R stereo sounds separately. When a conventional AFM hi-fi monaural system model is used to play back a tape recorded in AFM hi-fi stereo, it will produce the L+R monaural sound because the monaural model can reproduce only the 1.5 MHz carrier. The AFM hi-fi stereo system of this unit allows you to enjoy a live stereo sound atmosphere even with the standard track.

Frequency allocation of the hi-fi stereo system



Compatibility with conventional 8 mm video format

When you play back an AFM stereo hi-fi recorded tape with a conventional 8 mm video equipment, a sound is reproduced in monaural.

TBC (Time Base Corrector)

During playback, the TBC is automatically turned on to reduce jitter and further enhance the high quality of the picture recorded in the Hi8 video system.

On Jitter

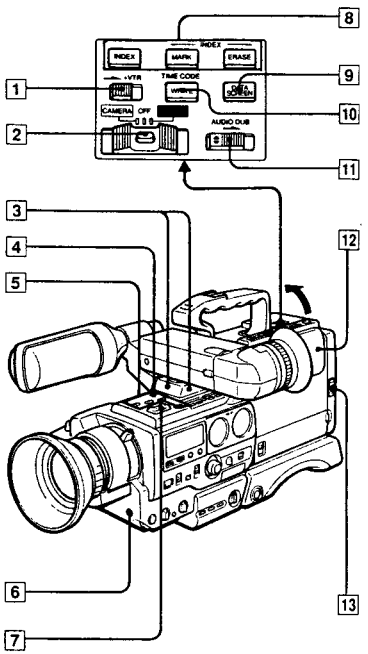
A signal recorded on the tape is demodulated to its original video signal through the rotating magnetic head. During this process, time base fluctuations due to uneven rotation of the head and varying tape running speed are added to the demodulated video signal. These time base fluctuations that occur with video equipment are called jitter. As long as the monitor can scan the fluctuation, no effect is produced on the image. However, when the jitter exceeds a certain limit, the image becomes unstable and a swaying motion or bend is produced on the monitor. For the Hi8 video system, particularly with its more than 400 lines of horizontal resolution and precise reproduction of the fine vertical lines, eliminating jitter will contribute greatly to further enhancing the picture quality.

Basic Principles of TBC

The write clock based on the synchronized signal (H, V) separated from the video signal temporarily writes the video signal with jitter to the field memory which the digital TBC uses. The stable read clock reads the signal data one by one in the order in which they were written in memory, and produces the video signal output without the jitter. When you repeat editing over and over, jitter accumulates and might corrupt the synchronized signal, thus causing the image to bend. The digital TBC with its field memory produces the synchronized signal output separately from the video signal after rewriting it into a stable one. Therefore, if you use this unit as the playback machine during editing for the purpose of reducing jitter, it will be effective in removing the image bend that occurs due to corruption of the synchronized signal. The TBC also reduces jitter caused by incompatibility (jitter which occurs when the recording machine and playback machine are of a different make). This unit is therefore highly suitable for use as the master unit.

Location and Function of Parts and Controls

(A-1)



For details on the use of each control, refer to the pages indicated in the circle.

(A-1)

1 **+VTR switch** ⑳ ㉛
During recording, to operate the buttons for the VTR, slide in the direction of the arrow.

2 **POWER switch**
CAMERA: For camera recording
VTR: For playing back or editing tapes with another equipment connected to the VIDEO/AUDIO INPUT or OUTPUT jacks.
OFF: Power off

3 **Remote control detector** ⑯

4 **COMMANDER ON/OFF switch**
Set to "ON" when using the supplied wireless Remote Commander. When you do not use the supplied Remote Commander or when you connect the receiver of the remote control kit (not supplied) to the REMOTE connector, set to "OFF".

5 **Digital picture buttons** ㉛
Press to make the digital pictures.
DIGITAL ZOOM button
P in S button
FADER/OVERLAP button
PICTURE button

6 **INDEX MARK button** ㉖
Press to mark the index signal **during recording.**

7 **EDITSEARCH button** ㉘ ㉙ ㊶

8 **INDEX buttons** ㉕
INDEX: Press to search the index signal marked.
MARK: Press to mark the index signal.
ERASE: Press to clear the index signal.

9 **DATA SCREEN button** ㉘
Press to display the indication on the viewfinder screen on the TV.

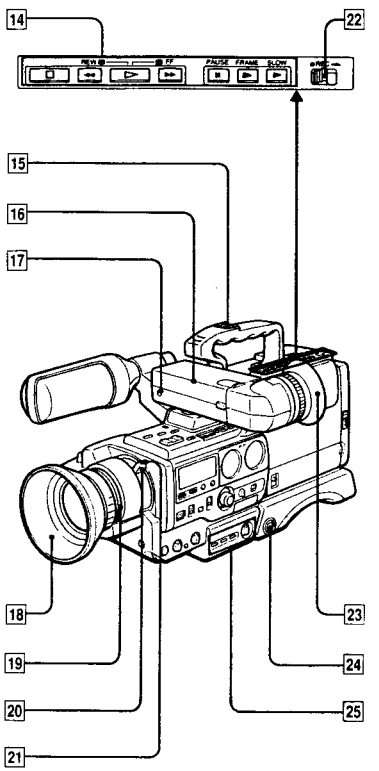
10 **TIME CODE WRITE button** ㉙
Use this button to write, rewrite or add the RC time code on the prerecorded tape.

11 **AUDIO DUB (dubbing) button** ㉚
Slide to dub the audio signals.

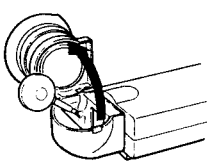
12 **Speaker**
During recording or playback, the monaural sound will be monitored.

13 **BATT (battery eject) knob** ⑱

(A-2)



(A-3)



(A-2)

14 **Tape transport buttons**
□ (stop), ◀◀ REW (rewind), ▷ (playback), ▶▶ FF (fast forward), ❚❚ PAUSE (pause), ❚❚▶ FRAME (frame-by-frame playback), ❚▶ SLOW (slow speed playback)

15 **Accessory shoe**
Attach a video light, etc.

16 **Viewfinder**
The picture being recorded or played back can be monitored in monochrome here. Also, data such as caution indicators and function mode are displayed on the viewfinder screen.

17 **Camera recording/battery/tape end lamp**
Lights during camera recording. It flashes when the battery is exhausted or the tape is at its end.

18 **Lens hood**

19 **Focus ring** ㉜

20 **Zoom lever** ㉟

21 **Macro set button** ㊱

22 **● REC (recording) switch**
Slide in the direction of the arrow.

23 **Eyecup**

24 **PUSH SLIDE button** ㉕
While pressing this button, adjust the position of the shoulder mount.

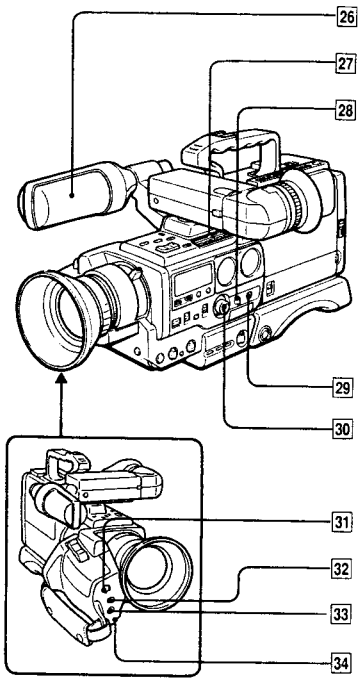
25 **Digital picture buttons** ㉛
Press to make the digital pictures.
STROBE button
SOLARIZATION button
NR (noise reduction) button
EFFECT LEVEL control

(A-3)

To remove dust from inside the viewfinder
Open the eyecup and remove the dust with a blower.

Location and Function of Parts and Controls

(A-4)



(A-4)

26 One point stereo microphone

27 SUPERIMPOSE buttons ⑬
Used to record the title.
TITLE 1 button
TITLE 2 button
MEMORY button
COLOR/MODE button

28 BALANCE control ⑮
The left/right channel balance of the microphone or input signal from the AUDIO INPUT jack can be adjusted.

29 MIC switch ㉙ ㉚
AUTO: Normally set to this position.
MANU: Set to adjust the volume or left/right channel balance of the microphone or input signal from the AUDIO INPUT jack.

30 REC LEVEL control ⑮
The volume of the microphone or input signal from the AUDIO INPUT jack can be adjusted. Normally set to the green position.

31 START/STOP button ㉖
Used for low position recording.

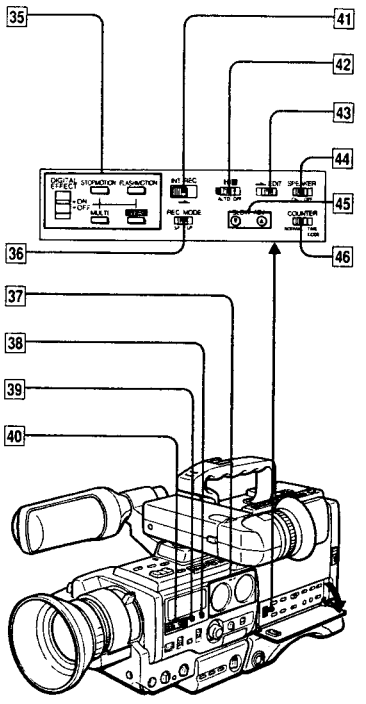
32 NAR. MIC (narration microphone) jack (mini jack) ㉞
Connect an external narration microphone

33 PHONES jack (stereo mini jack) ㉞
Connect the ear receiver.

34 PHONE LEVEL control ㉙
During playback, the sound level of the speaker or connected ear receiver can be adjusted.

Location and Function of Parts and Controls

(A-5)



(A-5)

35 Digital picture buttons ㊳
Press to make the digital pictures.
DIGITAL EFFECT switch
STOPMOTION button
FLASHMOTION button
MULTI button
CLEAR button

36 REC MODE selector

37 Level Meters and indicator ㉟

38 ZERO MEM (zero memory) button ㊵
Used to memorize the counter zero point.

39 COUNTER RESET button ㊵
Press to reset the counter to zero.

40 DATE (+)/ TIME (NEXT)/ DATA CODE buttons
Use these buttons to set the date and time, display the date and time, or display the data code during playback.

41 INT REC (interval recording) button ㉚
Slide to activate the automatic interval recording function.
The picture can be recorded for approximately one second every one minute.

42 Hi8 (high eight) mode switch ㉘
When set to the AUTO (green mark) position, the recording mode will be selected automatically according to the tape to be used.

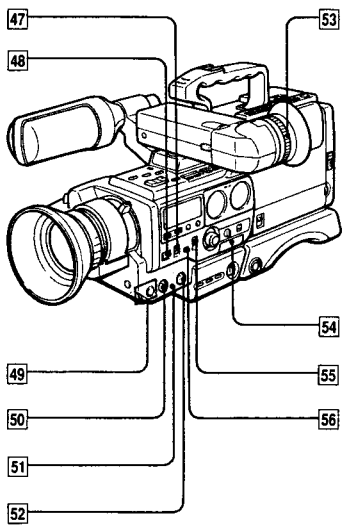
43 EDIT switch ㊾
Normally set it to the OFF position. When editing tapes, set in the direction of the arrow (ON).

44 SPEAKER switch ㉙
During recording or playback, set to ON to monitor the sound.

45 SLOW ADJ (adjustment) buttons ㊷

46 COUNTER mode select switch
NORMAL: Normally set to this position to display the tape counter.
TIME CODE: Set to this position to display the RC time code in the viewfinder and display window, and output from the REMOTE connector.

(A-6)



(A-6)

47 FOCUS switch (39)
Used for manual focusing.

48 AUTO LOCK switch (25) (37)
Normally set to the upper AUTO LOCK position (green mark).
To adjust the focus, white balance, iris, gain level or shutter speed manually, set to the lower position (white mark).

49 IRIS control (40)
Normally set to the center position (green mark).

50 WHT BAL (white balance) control (42)
Used for manual white balance adjustment.

51 (one push white balance) button (42)
Press to adjust the white balance precisely.

52 SHUTTER SPEED button (44)
Used to select the shutter speed.

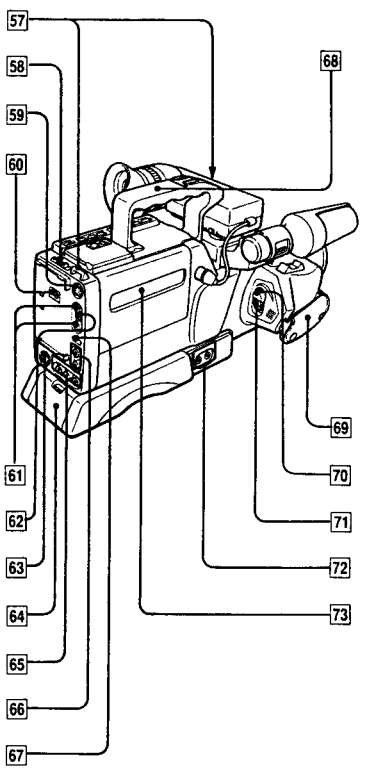
53 Viewfinder lens adjustment ring (24)
Adjust to your eyesight to assure good focus. Be sure to adjust this ring when shooting for the first time.

54 NARRATION MIC button (39)
Press to record your narration. When the PUSH mark is pressed, the microphone will be out.

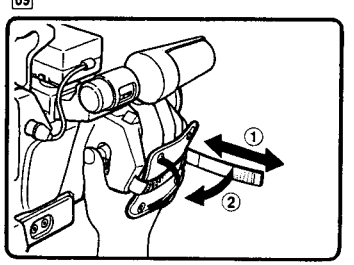
55 GAIN switch (43)
Set to 0dB or 18dB when the scene to be recorded is too dark.

56 PUSH AUTO button (40)
While recording with manual focusing, to set the unit into automatic focusing momentarily, press this button.

(A-7)



69



(A-7)

57 Hooks for shoulder strap (16)
Attach a shoulder strap.

58 EJECT (Cassette eject) button (28)

59 S VIDEO OUTPUT connector (4-pin mini-DIN) (59) (68)

60 DC IN connector

61 VIDEO/AUDIO OUTPUT jacks (phono jacks) (59) (62) (68)

62 RFU DC OUT (RFU adaptor DC output) jack (special minijack) (70) (84)
Supplies power to the RFU adaptor.

63 S VIDEO INPUT connector (4-pin mini-DIN) (63) (64)

64 Utility compartment
Insert the earphone, etc.

65 VIDEO/AUDIO INPUT jacks (phono jacks) (63) (64)

66 AUDIO OUTPUT jacks (phono jacks) (59) (63)

67 AUDIO MONITOR switch (73)
Selects the sound to be monitored during playback.

68 Carrying handle

69 Grip strap
Adjust the length so that your thumb can easily manipulate the START/STOP button.

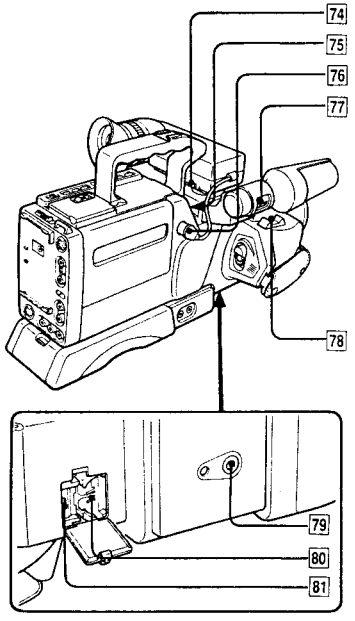
70 STANDBY switch (25)
Slide up to set the unit to recording pause mode.

71 START/STOP button
Press to start and stop camera recording.

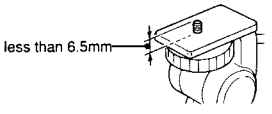
72 MIC (external microphone) jacks (phone jacks) (38) (90)

73 Cassette holder

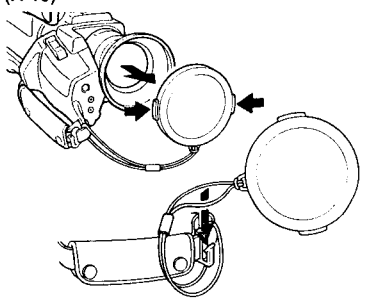
(A-8)



(A-9)



(A-10)



(A-8)

74 **PUSH SLIDE button** ㉕
Press to adjust the position of the viewfinder.

75 **REMOTE ↻ connector**

76 **VIEWFINDER connector** ⑯

77 **MIC (microphone) SELECT switch** ㉜
Normally set to the left (green mark) position.

78 **Variable power zoom button** ㊺

79 **Tripod receptacle**

80 **Lithium battery compartment** ㉒

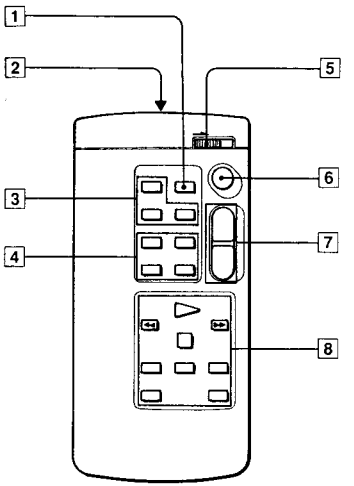
81 **Hi-fi sound output select switch** ㊼

Note when attaching a tripod not manufactured by Sony (A-9)
When attaching a tripod not manufactured by Sony, the length of the camera mounting screw must be less than 6.5 mm. Otherwise the screw may damage the inner parts of the camera.

To remove the lens cap (A-10)
Squeeze the sides as shown.
Hook the lens cap to the grip strap.

About the ↻
↻ means the LANC connector.
LANC stands for Local Application Control Bus System. The LANC connector is used for controlling the tape transport of video equipment and peripherals connected to it. This connector has the same function as the connectors indicated as CONTROL L or REMOTE.

(A-11)



Location and Function of Parts and Controls

Remote Commander

(A-11)

The buttons on the Commander have the same function as the buttons on the recorder with the similar name or mark.
When you use the Remote Commander
Be sure to set the COMMANDER ON/OFF switch on the camcorder to "ON" and then start operating the camcorder. Point the Remote Commander to the remote sensor on the camcorder.

1 **DATA SCREEN button** ㊽

2 **Transmitter**

3 **INDEX buttons** ㊺
INDEX button
MARK button
ERASE button

4 **Digital picture buttons** ㊽
Press to make the digital pictures.
MULTI button
ZOOM button
FLASH MOTION button
CLEAR button

5 **HOLD button**
To avoid miss operation, set in the direction of the arrow.

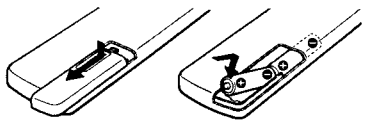
6 **START/STOP button**

7 **Power zoom button** ㊺
The size of the subject in the scene can be changed.
The zooming speed cannot be changed with this button.

8 **Tape transport buttons**
◀◀ **REW** button, ▷ **PLAY** button,
▶▶ **FF** button, □ **STOP** button,
● **REC** button, **PAUSE** button,
FRAME button, **SLOW** button

Location and Function of Parts and Controls

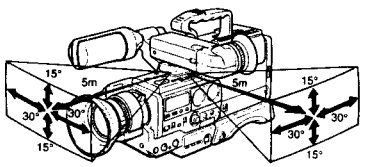
(A-12)



Installing the batteries (A-12)
Insert two R6 batteries with correct polarity.

Operation range (A-13)

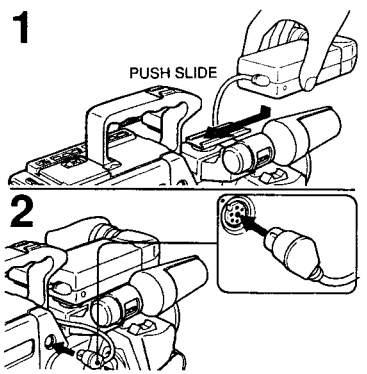
(A-13)



Notes on the handling of batteries
- With normal operation, the batteries will last for approximately six months.
- If the Commander will not be used for a long period of time, remove the batteries to avoid possible damage from battery leakage.

Notes on the Remote Commander
- Keep the remote sensor away from the strong light source such as direct sunlight or illumination. Remote control with the Commander may not be effective.
- Be sure that there is no obstacle between the remote sensor and Commander.
- The command mode of the Commander is VTR2. Avoid to use the Sony VTRs with the same command mode at the same time.
- Be sure to set the COMMANDER ON/OFF switch on the camcorder to "OFF" when you connect the receiver of a remote control kit (not supplied) to the REMOTE connector.

(B-1)



Attaching the viewfinder and the shoulder strap

Attaching the viewfinder

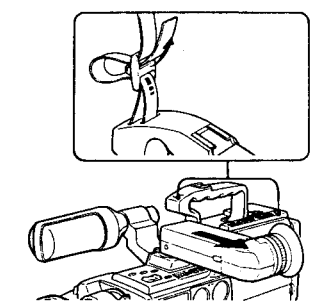
Before using the video camera recorder, attach the viewfinder. **(B-1)**

1 While pressing the PUSH SLIDE button, slide the viewfinder completely on the guide rail. Move the viewfinder frontward or backward a little until it locks.
2 Align the projection of the plug with the groove of the connector and connect the viewfinder cable to the viewfinder connector.

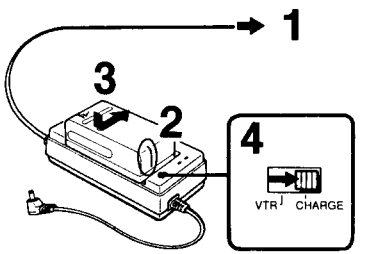
Attaching the shoulder strap

Slide the viewfinder as illustrated and then thread the shoulder strap. **(B-2)**

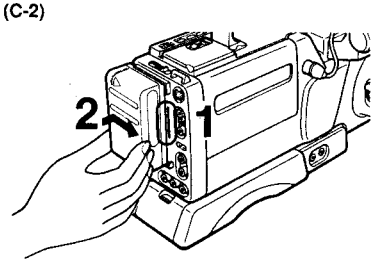
(B-2)



(C-1)



(C-2)



Connecting the Power Sources

First, Choose the Power Source

Place	Power source	Accesory to be used
Outdoors	Battery pack	Battery pack NP-77H (supplied), NP-77HD, NP-77 or NP-66H
Indoors	House Current	AC power adaptor AC-V50 (supplied)

Note on power sources
Disconnecting the AC power adaptor or removing the battery pack during recording or playback may damage the inserted tape. If this is done by accident, supply the power again immediately and turn on the power switch.

Using the Battery Pack

Step 1 : Charge the battery pack. (C-1)

1 Connect the AC power adaptor to a wall outlet.
2 Align the grooves on the battery pack with those on the AC power adaptor.
3 Slide in the battery pack to the right, as illustrated.
4 Set the mode selector to CHARGE.
5 charge the battery for:

Battery pack	NP-77H (supplied)/ NP-77HD	NP-77	NP-66H
Required charging time	140	120	100

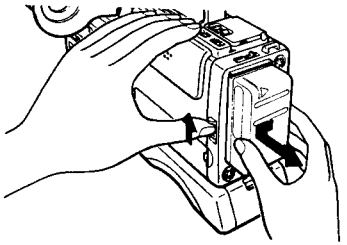
(approx. minutes)

See the instruction manual of the AC power adaptor for details.

Step 2 : Mount the battery pack on the camcorder (C-2)

1 Align the right side of the battery pack with the white line on the recorder.
2 Slide in the battery pack to the right.
Note: Make sure the battery fits completely on the mounting surface of the recorder. Imperfect fit may damage the projections on the recorder.

(C-3)



To remove the battery pack (C-3)
Slide BATT up, and at the same time, slide out the battery pack to the left.

Battery life
A fully charged battery pack lasts for:

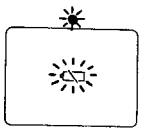
Battery pack	NP-77H (supplied)/ NP-77HD	NP-77	NP-66H
Battery life	40	30	25

(approx. minutes)

When the battery becomes weak, the ⌂ indication and red lamp will flash in the viewfinder. **(C-4)**
Replace the battery pack with a fully charged one.

- NP-55, NP-55H and NP-66 cannot be recommended for this unit because the battery life of these battery packs are too short to operate it.

(C-4)

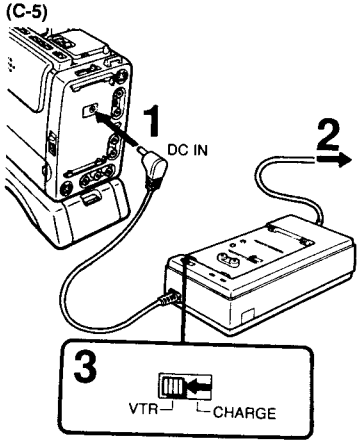


Using the AC Power Adaptor

(C-5)

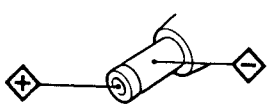
1 Connect the DC output plug of the AC power adaptor to the DC IN jack of the recorder.
2 Connect the AC power adaptor to a wall outlet.
3 Set the mode selector to VTR.
See the instruction manual of the AC power adaptor for details.

(C-5)

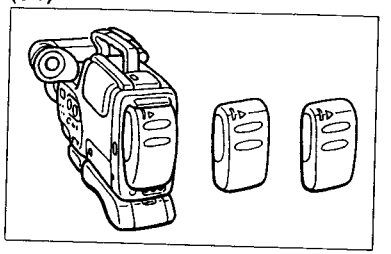


Note (C-6)
Use only the AC-V50 AC power adaptor (supplied).
Do not use any other AC power adaptor.
Polarity of the plug is shown in the illustration.

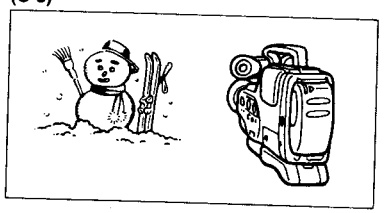
(C-6)



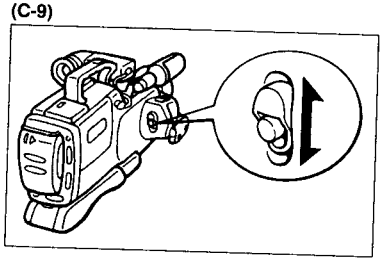
(C-7)



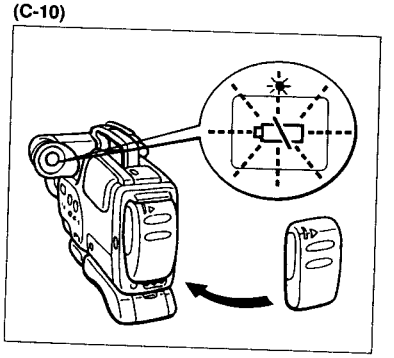
(C-8)



(C-9)



(C-10)



Use of the Battery Pack

How to Prepare the Rechargeable Battery Pack

Have sufficient battery pack power to do 2 or 3 times as much recording as is planned. (C-7)
"Battery life" as described in the instruction manual or catalogue of the video camera recorder is measured by the continuous recording time of the camera, placed in a normal temperature using a fully-charged battery.

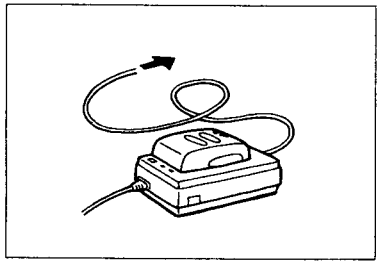
Battery life is shorter in a cold climate. (C-8)
Battery efficiency is decreased and battery life runs out more quickly.

While recording, turn the STANDBY switch of the camera on and off frequently. The battery life becomes longer. (C-9)
A smooth recording can be made even if recording is stopped and started again. While positioning the subject or selecting an angle, or looking through the viewfinder lens, the lens moves automatically and the battery is being expended. The battery is also being expended when a cassette is inserted or removed.

When the Rechargeable Battery Pack Should be Replaced

While recording, when the mark ⌂ seen in the viewfinder and red lamp change to rapid flashing from slow flashing. (C-10)
Turn off the POWER switch of the camera and replace the battery pack. Leave the cassette in the camera in order to obtain a smooth recording after the battery pack is replaced.

(C-11)



Notes on Charging

Before using the battery pack, charge it sufficiently. The Sony rechargeable battery pack is placed on the market without having been charged. **(C-11)**

Recharge the battery pack when it is exhausted.

- If recording is completed before the mark ⊂◻ appears in the viewfinder, it is recommended to eject the cassette, set the POWER switch to CAMERA and slide up the STANDBY switch until the mark ⊂◻ in the viewfinder flashes rapidly.
- Repeated charging while some capacity remains causes a lowering of battery capacity.

Recharge the battery pack before using if possible.

Keep the Terminals Clean

If the terminals are not clean, the battery duration will be shortened.
When the terminals are not clean or when the battery pack has not been used for a long time, install and remove the battery pack from time to time. This will improve the contact condition. Also, wipe the ⊕ and ⊖ terminals with a soft cloth or paper.

Notes on Rechargeable Battery Pack

Why the battery pack heats up
During charging or recording, the battery pack heats up. This means that electric energy has been generated and that chemical change has occurred inside the battery pack. This is not dangerous.

How to care for the battery pack

- Remove the battery pack from the video camera recorder after using it, and keep it in a cool place.
  When the battery pack is in the video camera recorder, an infinitesimal amount of current flows to the recorder even if the POWER switch is turned off. It causes overdischarging and shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Thus, it is recommended you charge the battery just before using.

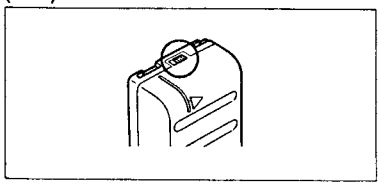
How many times can the battery pack be recharged
It can be fully charged and discharged about 500 times in normal temperature.
If the battery mark flashes rapidly just after turning on the video camera recorder with a fully-charged battery pack, the battery pack should be replaced with a new fully-charged one.

Temperatures during charging
Lower temperatures require a longer charging time.
Charging in temperatures ranging from 10°C to 30°C (5°F – 85°F) is recommended.

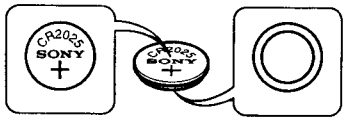
Carry the battery pack in a case.
Do not carry an uncovered battery pack. If the + and – terminals of the battery pack are shortened by a piece of metal, the battery will be heated abnormally. This is very dangerous. Never put an uncovered battery pack in a pocket with a key holder, etc.

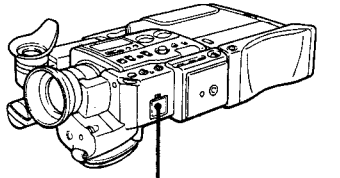
How to use the switch on the battery pack (C-12)
This switch is provided to show you the charging condition. Set the switch to the "no mark" position when the charging is completed. Set the switch to the "red mark" position when the battery is used up.

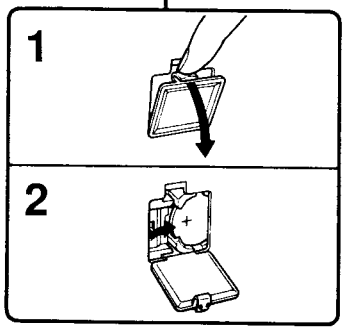
(C-12)



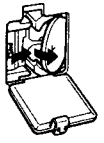
(C-13)







(C-14)



Connecting the Power Sources

Lithium Battery

(C-13)

To insert the lithium battery
This unit uses a lithium battery to activate the clock and to keep titles in memory. Before operating the unit for the first time, install the supplied lithium battery.

The lithium battery has a + (plus) side and – (minus) side.
Be sure to install the supplied lithium batteries with the correct polarity.

1 Open the cover of the lithium battery compartment on the bottom.
2 Install the supplied CR2025 lithium battery with the ⊕ side facing out.
3 Close the cover.

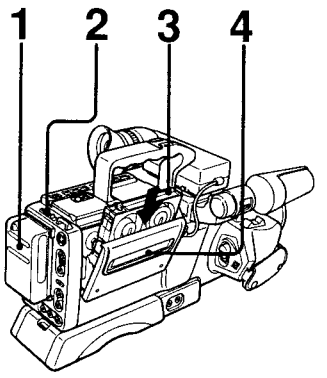
To remove the lithium battery (C-14)
Press the side of the battery in the direction indicated for installation.

Lithium battery life
Approximately 1 year in normal operation. When the lithium battery becomes weak, the numbers flash in the display window and the time indication will flash on the viewfinder screen for about 5 seconds.
In this case, **replace the battery with a Sony CR2025.** Use of any other type of battery may present a risk of fire or explosion.
After replacing the battery, readjust the date, time and titles. (If the battery is replaced with the battery pack attached, the readjustments are not necessary.)

Notes on lithium battery
- Keep the lithium battery out of the reach of children. Should the battery be swallowed, immediately consult a doctor.
- Wipe the battery with a dry cloth to assure a good contact.
- Do not hold the battery with metallic tweezers, otherwise a short-circuit may occur.
- When the battery pack is not attached, even if the lithium battery is installed, the indications in the display window will not light.

WARNING
Battery may explode if mistreated.
Do not recharge, disassemble or dispose of in fire.

(D-1)



(D-2)

Inserting a Cassette

Cassette Insertion

(D-1)

1 Connect a power source.
2 Press and slide the EJECT button.
3 Insert a cassette with the window facing outside.
4 Press the cassette holder to close it.

Cassette Ejection

1 Make sure that a power source is connected.
2 Press and slide the EJECT button.
3 Take out the cassette and press the cassette holder to close it.

To Prevent Accidental Erasure

Slide out the tab on the cassette so that it covers the opening. (A red mark will appear.) **(D-2)**

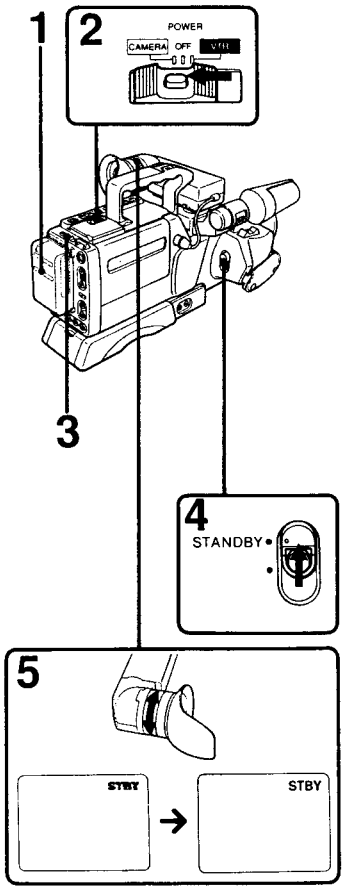
To re-record on the cassette, slide the tab in to uncover the opening.

Recording Mode

The recording time of a cassette in the LP mode is twice as long as that in the SP mode. The quality of the recording picture in the LP mode, however, will not be as good as that in the SP mode.

Notes
- Never insert anything in the small holes on the rear of the cassette. These holes are used to sense the kind of tape, thickness of tape, or if the tab is out or in, etc.
- To record from the beginning of the tape, run the video camera recorder for about 15 seconds at the beginning of a cassette before recording. It will avoid missing the starting point during playback on a video cassette recorder.
- Store tapes in their cases and keep them in an upright position to prevent intrution of dust and uneven winding.
- Store tapes in their cases and keep them away from heat, humidity, direct sunlight, magnetic fields, dust and mold.

(E-1)



Camera Operation

Adjustment of the Viewfinder Lens

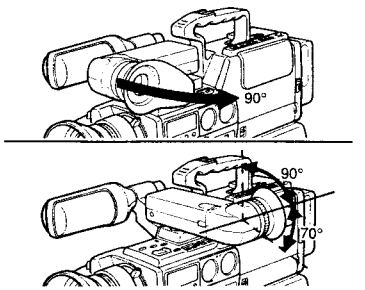
The position of the viewfinder lens for optimum vision varies depending on the person. **(E-1)**

1 Connect a power source.
2 While pressing the small button, set the POWER switch to CAMERA.
3 Insert a cassette.
4 Slide the STANDBY switch up.
5 Turn the viewfinder lens adjustment ring so that the indicator displayed on the viewfinder screen comes into sharp focus.

Adjustment of the viewfinder lens is necessary only for your initial use, or for use after someone else.

Note
If you leave the unit in the recording pause mode for 5 minutes or more, the unit will be automatically turned off. To resume recording pause mode, slide the STANDBY switch down once and slide it up again. To start recording, press the START/STOP button.

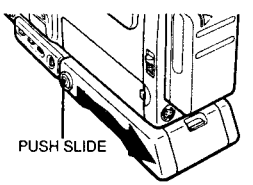
(F-1)



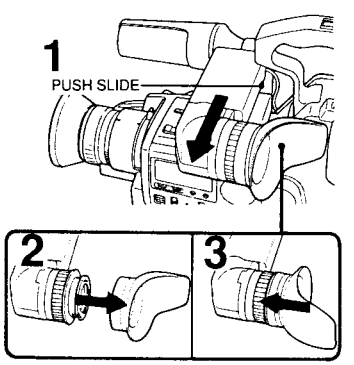
(F-2)

(F-3)

(F-4)



(F-5)



Easy Camera Recording with Automatic Adjustment

Holding the Video Camera Recorder

Setting of the viewfinder (F-1)
Turn the viewfinder until it locks (90 degrees).

To change the angle of the viewfinder
The viewfinder can be turned 90 degrees up and 70 degrees down to make high-angle or low angle shooting possible.

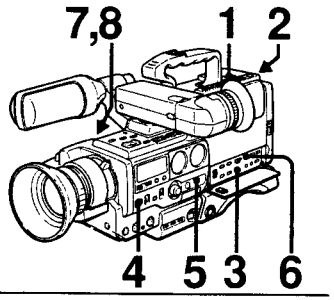
Basic posture for recording (F-2)
Put the video camera recorder on your shoulder and your right elbow firmly against your side.

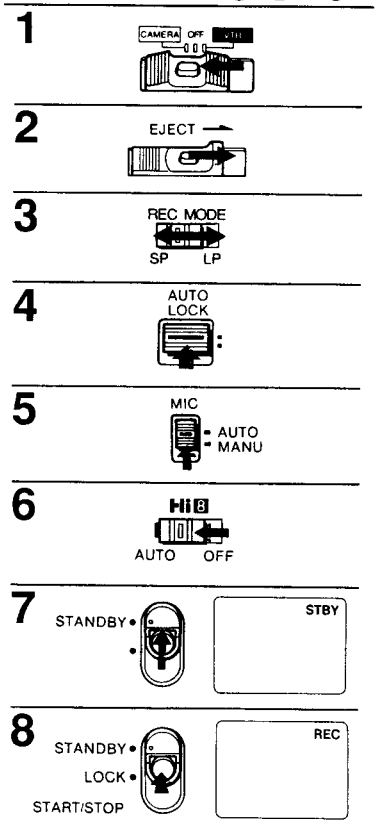
For low position recording (F-3)
1 Turn up the viewfinder.
2 Press the START/STOP button at the side of the lens.

To adjust the position of the shoulder mount (F-4)
While pressing the PUSH SLIDE button, slide the shoulder mount backward. The shoulder mount can be set to one of two positions.

To view with your left eye (F-5)
1 While pressing the PUSH SLIDE button, slide the viewfinder. The viewfinder can be set to one of two positions.
2 Pull out the rubber eyecup.
3 Turn the eyecup and reattach it.

(F-6)





How to Record

(F-6)

1 While pressing the small button, set the POWER switch to CAMERA.
2 Insert the cassette.
3 Set the REC MODE selector to LP or SP, according to the length of the programme to be recorded.
4 Set the AUTO LOCK switch to AUTO LOCK (green position).
For manual adjustment, see pages 37 to 44.
To adjust the white balance precisely, we recommend the manual white balance adjustment with the white lens cap.
5 Set the MIC switch to AUTO.
6 Set the Hi8 mode switch to AUTO (green mark).
The recording mode is selected automatically.
For Hi 8 video system tape Hi8 : Hi 8 mode recording
For standard 8 mm tape 8 : Normal mode recording
7 Slide the STANDBY switch up.
The unit will enter the recording pause mode.
8 Press the START/STOP button.
Recording will start.

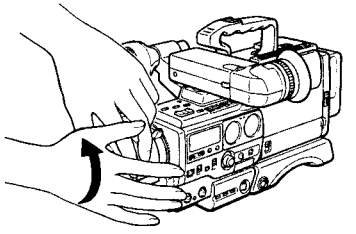
For digital picture recording, see "Viewing digital pictures" on page 61.

Check in the viewfinder screen
STBY: Displayed during recording pause mode.
REC: Displayed during recording.

To stop recording
Press the START/STOP button again. The unit will enter the recording pause mode. Avoid rough handling or mechanical shock to the unit. A smooth transition between scenes may not be made.

Note
When the tape for the Hi 8 video system Hi8 is used for normal recording, set the Hi8 mode switch to OFF.

(F-7)



Rec review using EDITSEARCH
Using EDITSEARCH, you can check the last portion of the previous recording. This is convenient for quick, on-the-spot checks.

1 Set the recorder in recording pause mode by pressing the START/STOP button.
2 Press the – ⏪ EDITSEARCH button momentarily.
The last few seconds of the recorded portion are rewound and then the recorded picture is monitored on the viewfinder screen. The unit then enters the recording pause mode.

If the picture has not been recorded
The video heads may be contaminated. Clean the heads using the Sony video head cleaning cassette.

After using
Slide the STANDBY switch down and set the POWER switch to OFF. (You need not press the center button when setting the switch to OFF.)

When attaching the lens hood, filter or conversion lens, hold the focus ring. **(F-7)**

When removing, press it with the palm of your hand and turn it counterclockwise.

Note on power source
If the POWER switch is moved during recording, the tape will stop.

The last portion of the recorded picture appears momentarily when the recording is started.
This is a phenomenon of the overlap operation (page 64).

How to display the RC time code during recording
During camera recording, the RC time code and data code (recording date and time) are automatically recorded on the tape. If you want to display the RC time code in the viewfinder and display window during recording, change the setting of the COUNTER mode to TIME CODE. To write the RC time code on a prerecorded tape, see page 80.

Note
The data code cannot be displayed during recording.

Brightness Levels

The single greatest influence on picture quality is the brightness level. Using the following chart as a reference, take a few minutes to familiarize yourself with brightness levels to improve your recording.

	Unit: lx	ND filter
Snow-covered mountains Snow fields Sandy beach, clear day in summer		required
Clear day, mid-day (100,000 lux)	100,000	
Clear day, mid-afternoon (35,000) Overcast day, mid-day (32,000)	10,000	
Overcast day, one hour after sunrise (2,000)		
Office lit by fluorescent lamps, near window (1,000)	1,000	
Clear day, one hour before sunset (1,000)		
Department store counter (500–700)		Normal Recording
Station wicket (650)	500	
Office lit by fluorescent lamps (400–500)		
Room lit by two 30 W fluorescent lamps (300)	300	
Subway station platform (300)		
Arcade at night (150–200)	100	
Theatre lobby (15–35) Candle light (10–15)	10	Video light recom-mended

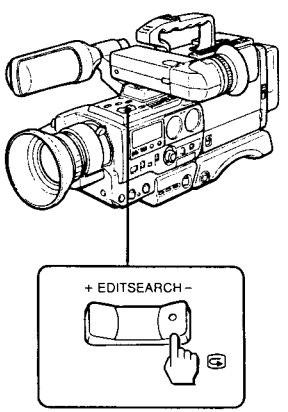
Instant Playback on the Spot

(F-8)

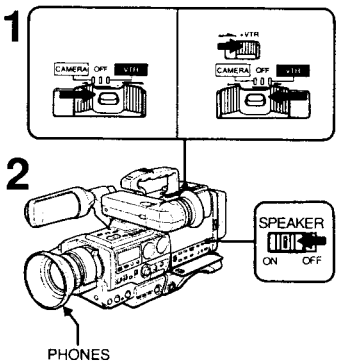
You can monitor the picture just recorded on the viewfinder screen.

1 While pressing the small button, set the POWER switch to CAMERA.
2 Slide the STANDBY switch up.
3 Press the "–" side of the EDITSEARCH button to view the playback picture in reverse.
4 Press the "+" side of the EDITSEARCH button to view the playback picture.

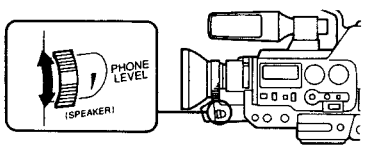
(F-8)



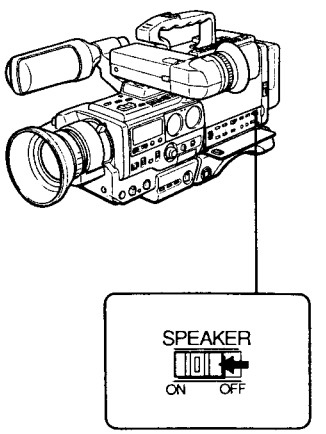
(F-9)



(F-10)



(F-11)



Easy Camera Recording with Automatic Adjustment

To Monitor the Playback Sound

(F-9)

1 While pressing the small button, set the POWER switch to VTR. If the POWER switch is set to CAMERA, set the +VTR switch in the direction of the arrow.
2 Set the SPEAKER switch to ON.
3 Rewind the tape.
4 Playback the tape.

To stop the tape, press the □ button.

To monitor the sound with the earphone
Connect the earphone to the PHONES jack. When the earphone is connected, even if the SPEAKER switch is set to ON, the sound from the speaker will be turned off.

To adjust the volume of the speaker or earphone (F-10)
Turn the PHONE LEVEL control.
[a] To increase the volume
[b] To decrease the volume

To Monitor the Sound during Recording

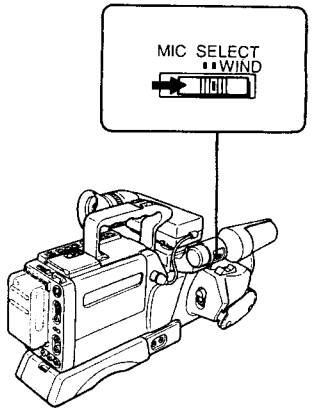
(F-11)

To monitor with the speaker:
Set the SPEAKER switch to ON.
The sound level cannot be adjusted in the recording mode by using the PHONE LEVEL control.

To monitor with the earphone:
Connect the earphone to the PHONES jack on the side of the lens.
When the earphone is connected, the speaker sounds will be turned off. The volume can be adjusted with the PHONE LEVEL control.

Easy Camera Recording with Automatic Adjustment

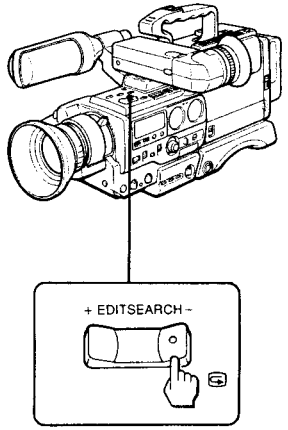
(F-12)



To Cut Wind Noise

Set the MIC SELECT switch to WIND to cut the low frequency noise, like wind noise etc.
(F-12)

(F-13)



During Recording, to Record Again on the Previous Recorded Portion (Editsearch 1)

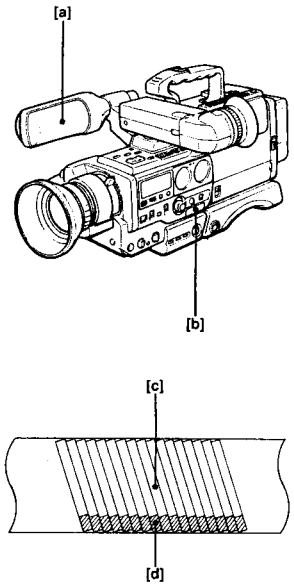
(F-13)

1 Slide the STANDBY switch up.
2 Monitor the picture on the viewfinder screen and locate the point from which the recording is to begin again with the EDITSEARCH button. Press the "+" side of the EDITSEARCH button to advance the picture at a normal playback speed, or the "–" side to reverse the picture.
3 At the desired point, release the EDITSEARCH button.
The unit will be set to recording pause mode.
4 Press the START/STOP button to start recording.

Smooth recording can be made even if the recording is stopped and started again, or even if the power is turned off and on again, provided that the cassette is not removed. But, if the cassette has been removed, proceed as above.

Audio Recording

(G-1)



There are two kinds of built-in microphones, one point stereo microphone and narration microphone.
The one point stereo microphone is a uni-directional type. The sharp directivity allows recording of the sound from the subject itself and its surroundings with natural sound quality.
The narration microphone is to be used for telling the event during recording.
The sounds from the one point stereo microphone can be recorded in stereo on the standard track and the PCM track, and the sounds from the narration microphone can be recorded in monaural on the standard track.

An external stereo microphone and external narration microphone can be connected to this unit, also.
For details on the recording tracks where the sounds from each microphone are recorded, see the table below.

When the built-in microphone is used, the audio signal is recorded as follows. (G-1)
[a] One point stereo microphone
[b] Narration microphone
[c] Standard track (hi-fi stereo recording)
[d] PCM track (digital stereo recording)

Sound to be recorded / Microphone to be used	Standard track		PCM track	
	L channel	R channel	L channel	R channel
One point stereo microphone	L sound	R sound	L sound	R sound
When the narration microphone is set to ON.	L sound and narration (monaural)	R sound and narration (monaural)	L sound	R sound

When an external microphone is connected, the audio signal is recorded as follows.
The sound from the external microphone can be recorded in stereo on the standard track and the PCM track. When the built-in narration microphone is used with the external microphone, the sounds from both microphones are mixed on the standard track.

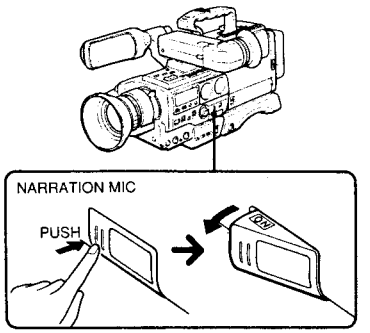
Sound to be recorded / Connection	Standard track L channel	Standard track R channel	PCM track L channel	PCM track R channel
L and R	external L microphone	external R microphone	external L microphone	external R microphone
L	external L microphone	external L microphone	external L microphone	external L microphone
R	built-in L microphone	external R microphone	built-in L microphone	external R microphone

When the external narration microphone is used
The sound from the external narration microphone can be recorded in monaural on the standard track. The Hi-Fi lamp will be turned off (page 35.)
When the built-in stereo microphone or the external stereo microphone is used with the external narration microphone, the sound from the stereo microphone can be recorded on the PCM track.

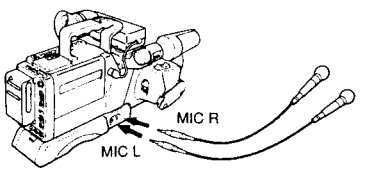
Use of the One Point Stereo Microphone

Normally set the MIC switch to AUTO and the recording level will be adjusted automatically. However, according to the recording condition or subject, more effective recording can be done by manual adjustment. See "Recording level adjustment" on page 35.
When there is strong wind, set the MIC SELECT switch to WIND. The effects of wind noise will be reduced.

(G-2)



(G-3)



Audio Recording

Use of the Built-in Narration Microphone

(G-2)

During recording, the narration can be recorded. Press the PUSH mark on the NARRATION MIC. While recording the narration, the sound from the one-point stereo microphone can be recorded on the standard track and the PCM track.
While recording with the POWER switch set to VTR, the narration can be recorded.

After using, push in the microphone.
The narration microphone will be turned off automatically.

Use of an External Stereo Microphone

(G-3)

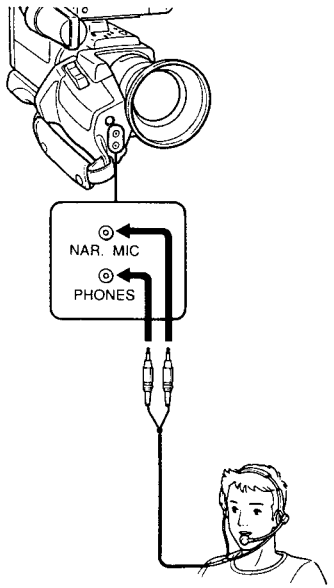
Connection example
Connect each microphone to the MIC L and R jacks.
When one microphone is connected, for the track where the sound from the built-in or external microphone is recorded, see the table on page 31.

Variety of optional microphones
- To pick up specific sounds
  — uni-directional microphone
- To isolate a sound
  — supercardioid microphone
- To allow the field of recording to be changed
  — zoom microphone
- To pick up sounds equally from all directions
  — omni-directional microphone

Adjustment of the recording level
See the "Recording level adjustment" on page 35.

Note
Keep the microphone far away from the TV so that the hum noise does not occur.

(G-4)



Use of an External Narration Microphone

(G-4)

When a stereo headphone equipped with the microphone is used, the narration can be dubbed during monitoring the recording sound.

When the external narration microphone is connected

- The built-in narration microphone will not be functioned.
- The sounds from only the external narration microphone can be recorded in monaural on the standard track.

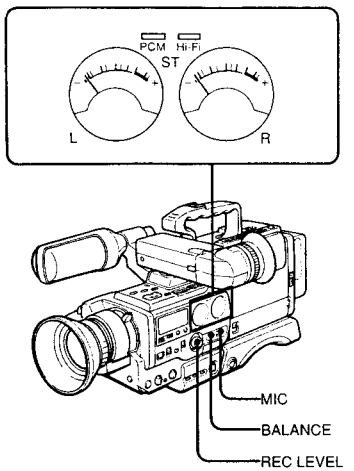
When the sounds are played back by the VTR without the PCM recording or playback function.

The sounds from only the external narration microphone will be played back.

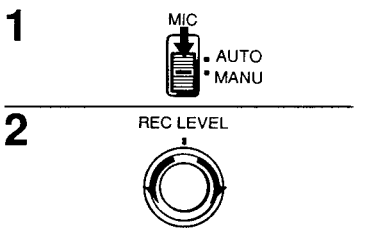
Adjustment of the recording level

See the "Recording level adjustment" on page 35.

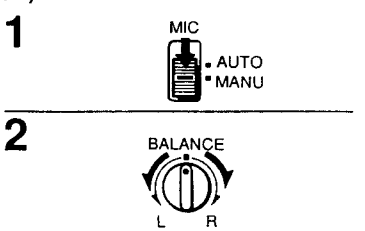
(G-5)



(G-6)



(G-7)



Recording Level Adjustment

When the MIC switch is set to the green (upper) position, the recording level of the microphone will be adjusted automatically. However, for the audio dubbing or the tape editing, the manual adjustment is recommended. **(G-5)**

Volume adjustment

(G-6)

1 Set the MIC switch to MANU.
2 Adjust the volume.
Turn the REC LEVEL control so that the meter sometimes enter into the red zone.

Balance adjustment

(G-7)

1 Set the MIC switch to MANU.
2 Turn the BALANCE control to adjust the balance.
To increase the volume of the right channel
— Turn towards the R side.
To increase the volume of the left channel
— Turn towards the L side.

Order of the adjustments

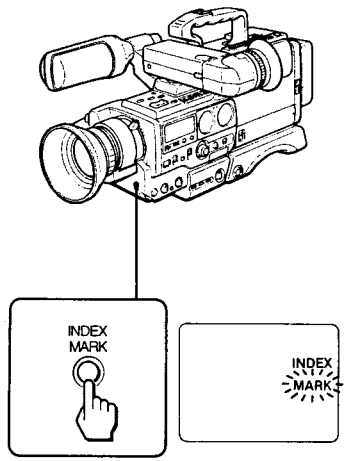
First adjust the volume and then balance.

Reading the level meter

- If the meter frequently swings into the red zone, the recorded sound is distorted.
- If the meter hardly swings at the left position, recording will be noisy.

To Mark Index Signals during Recording

(G-8)



The desired programme can be easily located by an index signal marked on the tape.
Press the INDEX MARK button at any desired point on the tape during camera recording.
(G-8)

When the index signal is marked in the recording pause mode (the MARK indication flashes), the index signal will be marked just after the recording pause mode is released.

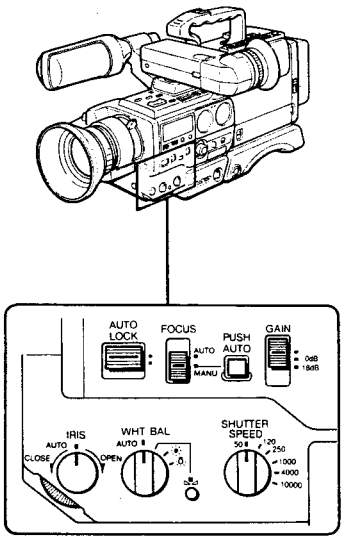
For other index operations, see page 75.

Notes
- The index signals can be marked at any desired point. But make sure there is more than 2 minutes of space between two index signals. If there is more than one index signal marked within an interval of 2 minutes on a normal tape run, the unit may not function properly.
- The INDEX MARK indication disappears automatically.
  Continue to record until the INDEX MARK disappears so that the recorded index signal can be searched correctly in the playback mode.

When the POWER switch is set to VTR, the index signal can also be marked during recording.
If the REC switch is pressed to start recording in the stop mode, an index signal will be automatically marked at the beginning of the tape.

Selection of the Automatic and Manual Adjustments

(H-1)



Function of the AUTO LOCK Switch

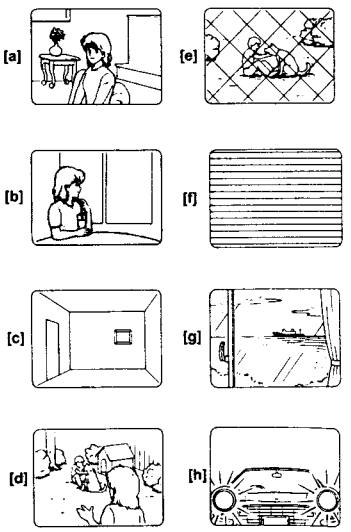
When the AUTO LOCK switch is set to AUTO LOCK (green mark), the iris, focus, white balance, gain level and shutter speed (1/50) are adjusted automatically. But under certain circumstances, such as the white balance adjustment, manual adjustment is better for effective recording. **(H-1)**

When the AUTO LOCK switch is set to the lower position (white mark), each manual function works as follows.

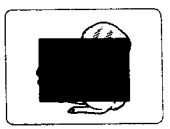
FOCUS See page 38.	For manual focusing, set to MANU.
PUSH AUTO See page 40.	When this button is kept depressed, auto focusing activates in the manual focusing mode.
WHT BAL. See page 41.	According to the condition in which the recorder is used, set to • or ☼.
WHT BAL See page 42.	When the WHT BAL is set to and the button is pressed, the white balance is adjusted manually.
GAIN See page 43.	Set to 0 dB or 18 dB to adjust the gain level.
IRIS See page 43.	• When the shooting subject is too dark, turn to OPEN. • When the shooting subject is too bright, turn to CLOSE.
SHUTTER SPEED See page 44.	Set this according to the shooting subject.

Even if the AUTO LOCK switch is set to the lower position, if each control is set to AUTO, its auto function will work. It is convenient to use some functions in manual mode and others in automatic mode.

(H-2)



(H-3)



Manual Focusing

Use manual focusing when shooting subjects difficult to focus automatically.

Poor Conditions for Auto Focusing

(H-2)

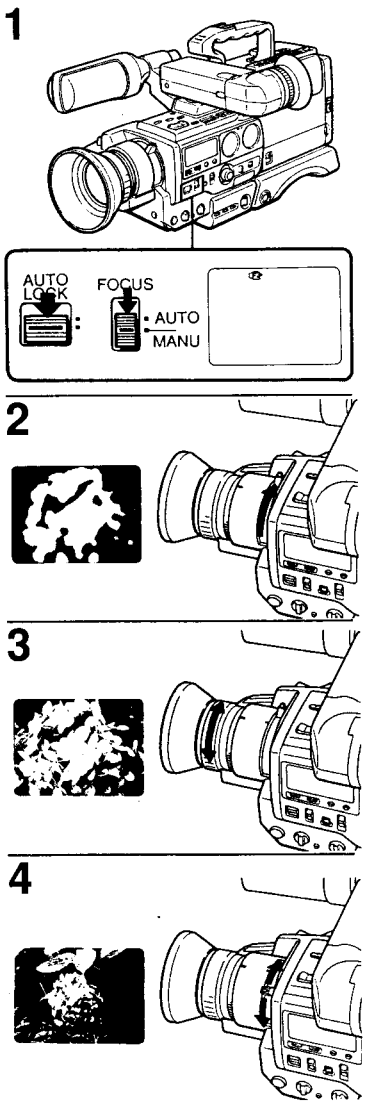
[a] Insufficient light
[b] Too much bright light behind the subject
[c] Subjects with flat colours and less contrast – wall, sky, etc.
[d] When the distance between subjects at the center is extreme (e.g. one subject is close, the other is away)
[e] Subjects beyond screens, nets, etc. or when another subject passes across the camera
[f] Horizontal stripes
[g] When there is frosted glass between the shooting object and the recorder
[h] Bright object or object reflecting light

Other Uses of Manual Focusing

- When the ☞ mark inside the viewfinder flashes
- When using special effects lenses or filters
- When shooting still subjects on a tripod
- To save battery wear
  (When the AUTO LOCK switch is set to AUTO LOCK, the auto focusing operates to move the focus ring automatically even in recording pause mode. This causes the battery to wear continuously.)
- For focusing in close-up shooting, see page 46.

Auto focusing system
The auto focusing system incorporated in this unit utilizes high-precision sensors to determine picture contrast at the centre of the viewfinder screen (the blue portion marked in the illustration) and adjust focus accordingly for automatic, highly accurate focusing. **(H-3)**

(H-4)



Notes
Auto focus does not function momentarily in these cases;
- When the shutter speed or the white balance is changed
- When the iris is being adjusted
- When lighting conditions change quickly
- When the zooming is changed from wide-angle to telephoto
- When the gain level is changed.

It may take several seconds to get focus when the camera is rapidly panned from a distant subject to a near subject with less contrast. In this case, adjust the focus manually.

Note on automatic adjustment
While recording with the auto focusing function, do not touch the focus ring forcibly.

To Focus Manually

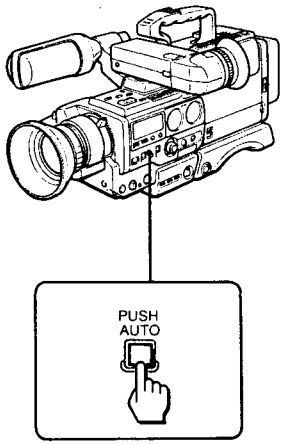
(H-4)

1 Set the AUTO LOCK switch to the lower position and set the FOCUS switch to MANU. The ☞ mark will be shown in the viewfinder.
2 Turn the manual zoom lever to the telephoto position (80) to make the subject as large as possible in the viewfinder.
3 Turn the focus ring to achieve sharp focus.
4 Set the desired shot length using the manual zoom lever.

Some helpful hints
- When shooting a scene with lots of movement in bright light, the subject can be kept in good focus by setting the zoom lever to the wide-angle position and the focus ring to 2 m, regardless of the distance between the subject and the recorder.
- When shooting in low light situations such as indoors, the depth of field in proper focus is very shallow. For best results, shoot at wide angles, after focusing in telephoto.
- The figures on the focus ring indicate the distance between the subject and the φ mark on the recorder.

When the wired commander not supplied is used
The focus adjustment cannot be set to auto or manual with the commander.

(H-5)



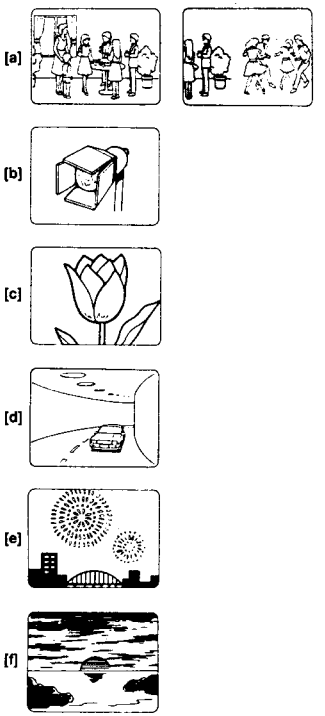
Manual Focusing

Quick Focus Adjustment

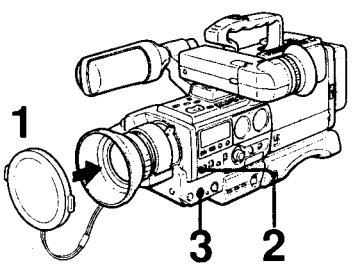
(H-5)

Press the PUSH AUTO button during recording in the manual focusing mode. Auto focusing will be activated only when the PUSH AUTO button is kept depressed.

(H-6)



(H-7)



Manual White Balance Adjustment

The auto white balance function of this unit operates automatically.
However, to record the colour of the subject more correctly so that it is not affected by the colour temperature of the ambient light, adjust the white balance manually using the white lens cap.

Difficult Conditions for Auto White Balance

(H-6)

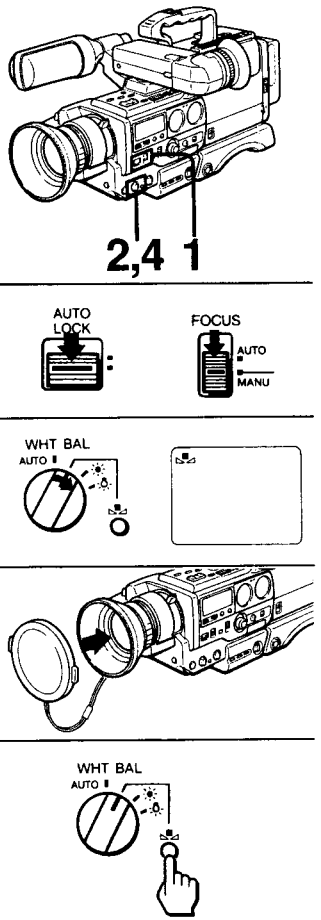
[a]	When lighting conditions change quickly	
[b]	When the light source for the subject is different from that illuminating this unit, such as when the subject is in a spotlight, etc.	
[c]	When shooting a monochromatic subject or the background is monochromatic	
[d]	• When recording under a sodium lamp • When recording under a mercury lamp	
	• When recording under a white fluorescent lamp	
[e]	When recording outdoors, such as a night view, neon sign or fireworks	
[f]	When recording outdoors, such as scenes after sunset or scenes before sunrise.	

To Adjust the White Balance Manually

(H-7)

1 Attach the white lens cap.
2 Set the AUTO LOCK switch to the lower position.
3 Set the WHT BAL control to the desired position.

(H-8)



Manual White Balance Adjustment

To adjust the White Balance Precisely

After setting the white balance with the button according to the subject, even if the light source is changed, the adjustment is held. It is convenient to record some subjects in the different light conditions in the same white balance setting.
(H-8)

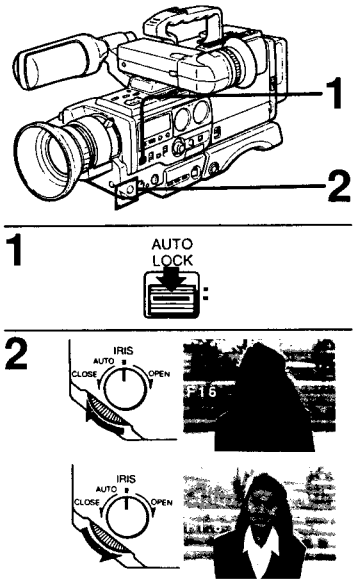
1 Set the AUTO LOCK switch to the lower position, FOCUS switch to MANU and adjust the focus manually.
2 Set the WHT BAL control to .
The indication will appear inside the viewfinder.
3 Attach the white lens cap to the recorder and point the recorder at a subject (outdoors) or a light source (indoors).
4 After starting recording, press the button.
The indication will light up.
The adjustment is memorized for 1 hour even after the POWER switch is set to OFF.

When recording in studio light or video light
Set the WHT BAL control to . The mark position has been set so as to adjust the white balance according to studio lights or video lights.

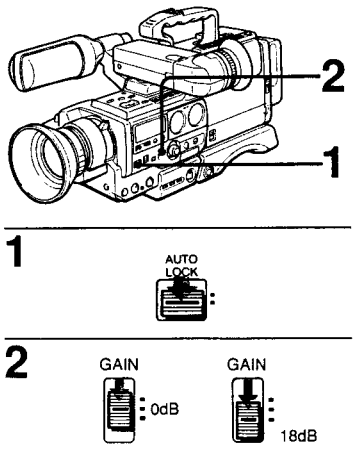
When recording in fluorescent light
Use the AUTO mode to adjust the white balance precisely.

Notes
- When the light source is changed, reset the mode again.
- When the one push white balance is adjusted for low light situations or without the white lens cap on the lens, even if the button is pressed, the indicator does not light up.
- The white balance is related to iris and shutter speed adjustment. When the iris or shutter speed is adjusted manually, if the recorder is moved indoor to outdoor or vice versa, set the AUTO LOCK switch to AUTO LOCK and reset it to the lower position again.
- When the recorder has been moved indoor to outdoor, or vice versa, or when the battery has been changed, slide the STANDBY switch up and point the recorder to a white object for about 10 seconds so that the white balance is adjusted properly.

(H-9)



(H-10)



Manual Iris Adjustment

The iris is adjusted automatically when the AUTO LOCK switch is set to AUTO LOCK (green position). When shooting a scene with strong contrast, adjust the iris manually.
(H-9)

1 Set the **AUTO LOCK** switch to the lower position (white mark).
2 Adjust the IRIS control.
[a] When backlit shot results in the subject being too dark:
Turn IRIS toward OPEN.
[b] When a subject is too bright against a dark background:
Turn IRIS toward CLOSE.

After shooting that particular scene, set the IRIS control to the center position (green mark) or set the AUTO LOCK switch to AUTO LOCK.

Note
Avoid pointing the recorder at the sun with the IRIS control set to OPEN.

Manual Gain Level Adjustment

When the entire scene is too dark and the subject is not clear, adjust the gain level. **(H-10)**

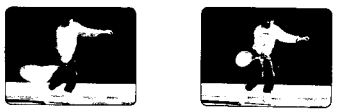
1 Set the AUTO LOCK switch to the lower position (white mark).
2 Set the GAIN switch to 0dB or 18dB.
[a] dark
[b] too dark

After shooting that particular scene, set the GAIN switch to the upper position(green) or set the AUTO LOCK switch to AUTO LOCK.

About gain level adjustment
- The effect of this function will be obtained only when the scene is dark.
- When the GAIN switch is set to 0 dB or 18 dB, the picture may show poor definition.

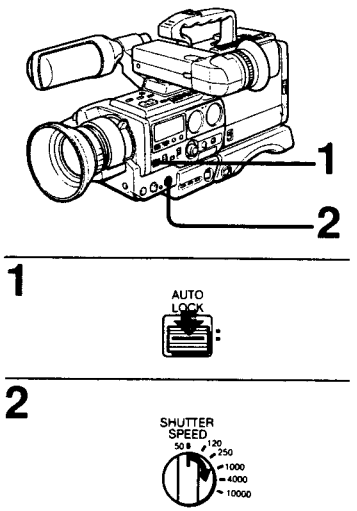
Shutter Speed Adjustment

(H-11)



When a fast-moving subject is recorded at a normal shutter speed, its still picture may not be seen clearly when played back **(H-11)**. This can be improved by increasing the shutter speed. The shutter speed of this unit can be selected from six speeds, 1/50 (normal speed), 1/120, 1/250, 1/1000, 1/4000 or 1/10000 second. However, when the shutter moves fast, it will not allow enough light to come into the lens, so the picture will be dark. Therefore, when recording at a high shutter speed, record in a brighter place than usual.
Choose an appropriate shutter speed according to the place and situation.
See the chart below for examples.

(H-12)



Example use	Recommended shutter speed
• On clear days, recording golf or tennis scenes (To view the hit ball clearly in the pause mode, set to 1/4000 or 1/10000) • Recording the skiers	1/10000 or 1/4000
• On overcast days, recording a moving merry-go-round or jet-coaster • Recording outdoors from inside a vehicle (for stable shooting)	1/1000 or 1/250
• Instead of the ND2 filter (To reduce the exposure level to approx. 1/2) • Recording indoors (for stable shooting)	1/120

(H-12)

1 Set the AUTO LOCK switch to the lower position.
2 Set the SHUTTER SPEED control to the desired shutter speed.

No indication (1/50) → 120 (1/120) → 250 (1/250) → 1000 (1/1000) → 4000 (1/4000) → 10000 (1/10000)

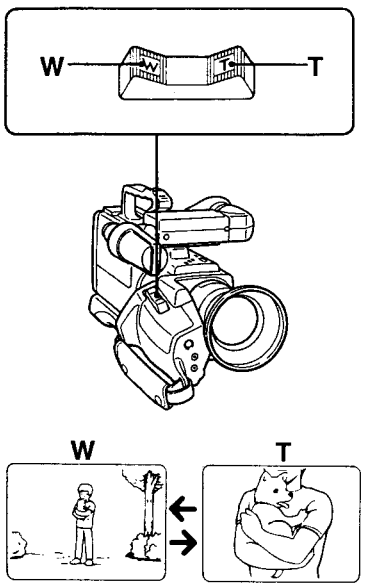
Notes
- When shutter speed 1/250 or faster is selected, recording must be done under sunlight or video light.
- When the shutter speed is changed during a camera recording of a TV screen, the brightness of the recorded picture may vary.
- When a very bright object is shot at a faster shutter speed, a light, vertical, belt-like line ("smear") may appear on the screen.

Zooming

The size of the subject in the scene can be changed.

Power Zoom

(I-1)



— for smooth and constant zooming

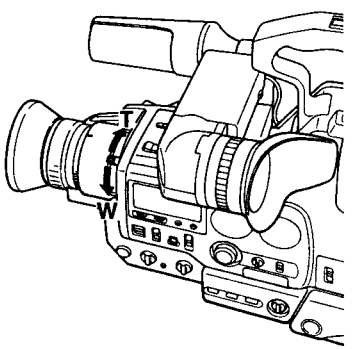
Press the T side of the power zoom button for telephoto and the W side for wide-angle. The zoom ring will move automatically.

The zooming speed is faster when the power zoom button is pressed firmly, and slower when the button is pressed lightly.

Note on use of the Commander
During the fast-forward or rewinding, the power zoom button on the Commander will not function.

Manual Zoom

(I-2)

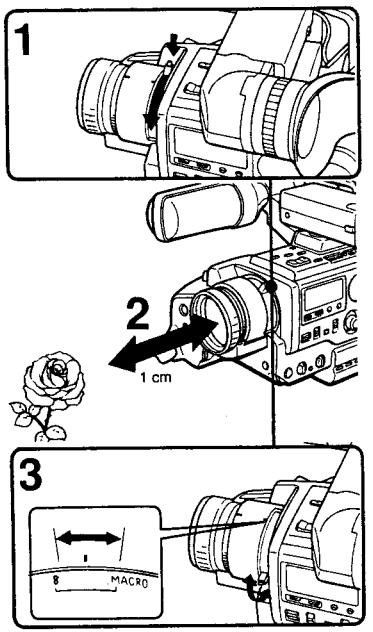


— to create a dramatic effect

Turn the manual zoom lever upward for telephoto and downward for wide-angle.

For more zooming effect
- The focal length of this unit is 8 mm to 80 mm. Converted into the focal length of a 35 mm camera, this means approximately f-43 mm to 430 mm.
- The zooming speed cannot be changed by the supplied Remote Commander.

(I-3)



Close-ups (Macro)

Even tiny objects can literally fill the screen for dramatic close-up effects.
Remove the lens hood before operation.

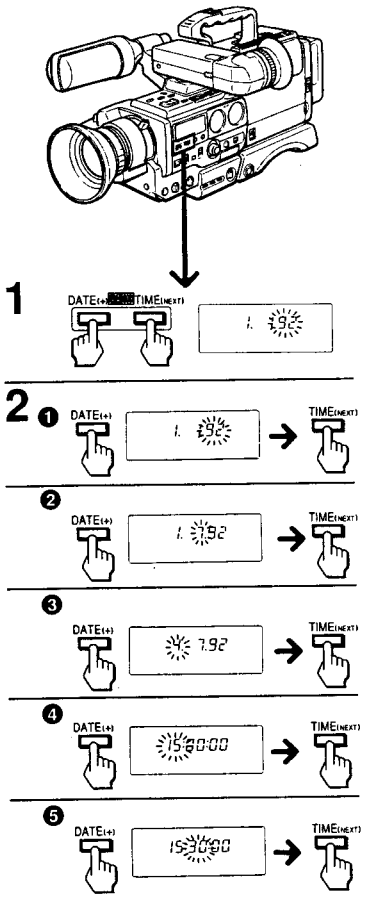
(I-3)

1 Turn the zoom lever to the MACRO position, pressing the macro set button.
2 Bring the recorder as close as necessary to obtain the desired subject size.
The subject can be as close as approximately 1 cm ($^{13}/_{32}$ in.) from the lens surface.
3 Turn the zoom lever within the MACRO range to focus sharply.

Notes

- Auto focusing does not function in macro shooting.
- If the subject is closer than 1 cm, it cannot be brought into focus.
- When shooting in macro, the depth of field is very shallow, so pay attention to focus. To keep the subject in focus, use a tripod or monopod.

(I-4)



Recording Date and Time

Once the date and the current time are adjusted, the date or time can be recorded together with the picture.

Before setting the date and time, make sure that the fully-charged battery pack and lithium battery are installed.

To Set Date and Time

(I-4)

- Make sure that the POWER switch is set to OFF or CAMERA.

1 Press the DATE and TIME buttons simultaneously **for more than 1.5 seconds**.
The date indication will appear in the display window (date/time setting mode). The DATE button now functions as the + button and the TIME button functions as the NEXT button.
2 Adjust the ❶ year, ❷ month, ❸ day, ❹ hour and ❺ minute in sequence, following the illustration.
First adjust the blinking digits with the DATE button, and then press the TIME button.
After adjusting the minute digits, press the TIME button, at the same time with an announced time signal.

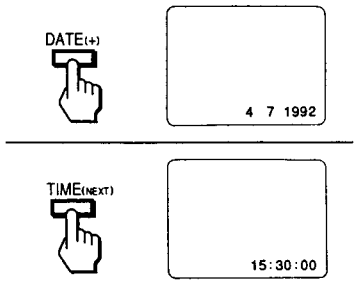
The clock starts operating. There is no need to readjust the date and time as long as the lithium battery remains.

To clear the time indication from the display
Press the TIME button again.

The DATE button can be pressed in two ways

- When you keep the button pressed, the digits will advance continuously.
- When you press and immediately release the button, the digits will advance by one.

(I-5)



Recording Date and Time

To check the preset date or time
Press the DATE or TIME button in the recording pause mode. When the same button is pressed again, the indication goes off.

To readjust an incorrect date or time
Set the unit to date/time setting mode and press the TIME button repeatedly until the incorrect digit flashes. Correct it with the DATE button and press the TIME button. After adjusting the minute digits, press the TIME button at the same time with an announced time signal.

Note
The date and time cannot be set during recording.
If the recorder is set to the recording mode while setting the date and time, the setting mode will be released.

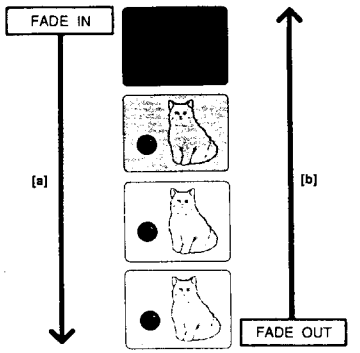
To Record the Date or Time

(I-5)

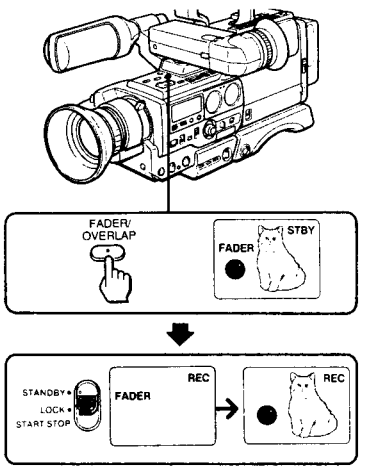
During camera recording or in recording pause mode, press the DATE or TIME button to display the date or time on the viewfinder screen.
The date or time being displayed will be recorded together with the picture.

To stop recording the date or time
Press the DATE or TIME button again. The picture recording will continue.

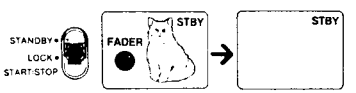
(I-6)



(I-7)



(I-8)



Fade-in and Fade-out

(I-6)

When fade-in, the picture and sound will appear gradually from a black, silent screen. **[a]**
With fade-out, the picture and sound will disappear gradually. **[b]**
Dramatic effects can be added by using fade-in at the beginning of a recording and fade-out at the end.

To Fade in

(I-7)

1 Slide the STANDBY switch up to set the unit to recording pause mode.
2 Press the FADER/OVERLAP button once.
3 Press START/STOP button to start camera recording.
Fade-in will be performed.

To Fade out

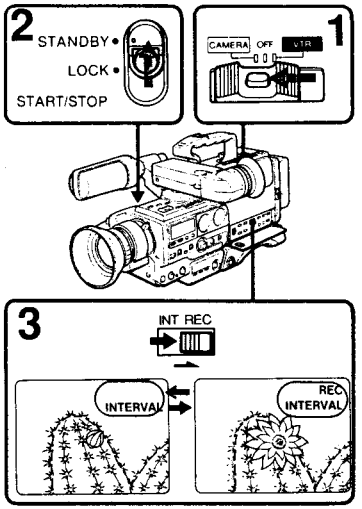
(I-8)

1 Start camera recording.
2 Press the FADER/OVERLAP button once.
3 At the point where fade-out is to be started, press the START/STOP button.
Fade-out will be performed and then recording will stop.

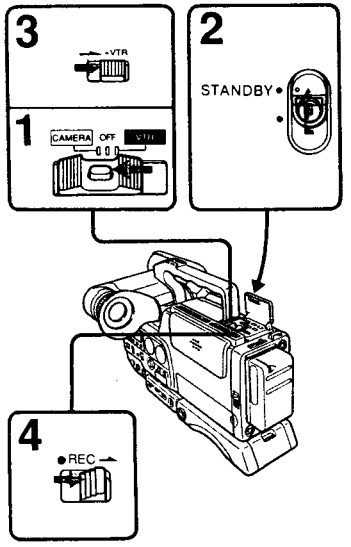
To cancel FADER mode before fade-in or fade-out
Press the FADER/OVERLAP button twice so that the FADER indication disappears.

Notes
- The FADER/OVERLAP button will function while the STBY or REC indication lights. When the +VTR button is set in the direction of the arrow, the FADER/OVERLAP button will not function in the stop mode.
- The FADER mode is cancelled automatically once fade-in or fade-out has been performed.
- The fader function cannot work for the sounds from the built-in or external narration microphone.

(I-9)



(I-10)



Interval Recording

A recording of one second will be activated repeatedly at one minute intervals. This is convenient for recording changes such as a flower developing from bud to flower or on insect growing wings. **(I-9)**

1 While pressing the small button, set the POWER switch to CAMERA.
2 Set the video camera recorder to the recording pause mode.
3 Slide the INT REC button in the direction of the arrow. The interval recording will be started and the "STBY INTERVAL" will be displayed.
4 Slide the INT REC button in the direction of the arrow to stop the interval recording.

- For interval recording, signals from the VIDEO/AUDIO input jacks can be recorded. Set the POWER switch to VTR.

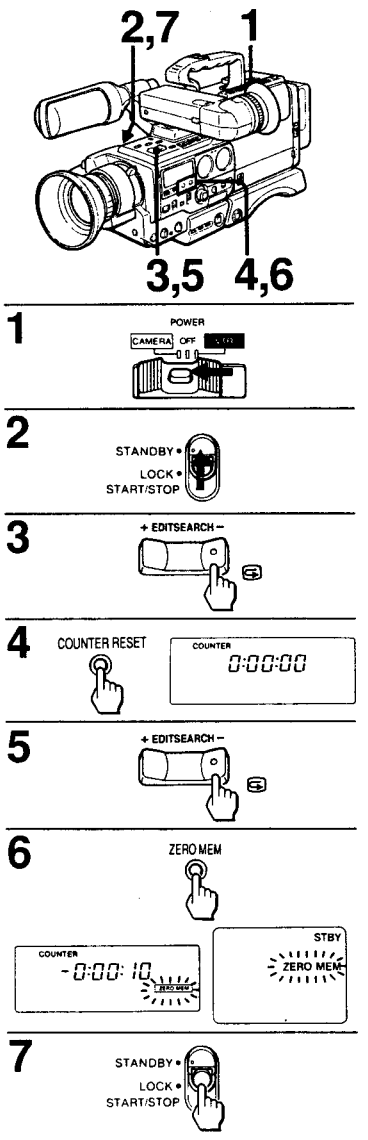
Frame Recording

A recording of six frames can be activated manually for creating an animated programme of your own. **(I-10)**

1 While pressing the small button, set the POWER switch to CAMERA.
2 Slide the STANDBY switch up.
3 Set the +VTR switch in the direction of the arrow.
4 Slide the ●REC switch in the direction of the arrow.
A recording of six frames will be made and the recording pause mode will resume.
5 Move the subject a little and repeat step 4 as many times as you like.

- For frame recording, signals from the VIDEO/AUDIO input jacks can be recorded. Set the POWER switch to VTR.
- After completing the frame recording, be sure to set the +VTR switch in the opposite direction of the arrow.

(I-11)



Editsearch

You can insert (record) video and audio simultaneously from the camera onto any recorded tape.

Operation

(I-11)

- Monitor the picture being inserted on the viewfinder screen.
- Select the same tape speed as was used for already recorded portion with the REC MODE selector.
- Make sure that the +VTR switch is set to the opposite direction of the arrow.
- Make sure that the COUNTER mode select switch is set to NORMAL.

1 While pressing the small button, set the POWER switch to CAMERA.
2 Slide the STANDBY switch up to set the unit to recording pause mode.
3 Keep pressing the "+" or "–" side of the EDITSEARCH button and release the button at the point where the insert should **end**. The unit will be set to recording pause mode.
4 Display the counter in the display window and press the COUNTER RESET button. The counter is reset to zero. (For an accurate ending point, press the COUNTER RESET button immediately after the EDITSEARCH button is released and while the still picture is displayed.)
5 Keep pressing the "–" side of the EDITSEARCH button and release the button at the point where the insert should **begin**.
6 Press the ZERO MEM button.
The insert ending point is stored in memory.
7 Press the START/STOP button.
Insert recording will begin.

The insert recording will stop automatically near the counter zero point.

To cancel ZERO MEM mode
Press the ZERO MEM button so that the ZERO MEM indicator disappears.

To change the insert ending point
Press the ZERO MEM button to turn off the ZERO MEM indicator and repeat steps 3 through 6 above.

To insert the date or time
Follow steps 1 through 6 above, press the DATE or TIME button to display the date or time indication on the viewfinder screen and then press the START/STOP button.

Editsearch

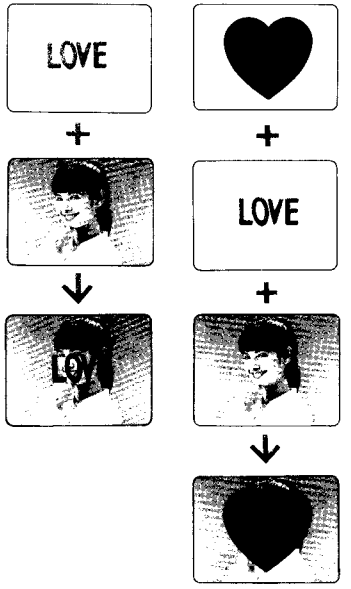
When the battery is removed with the STANDBY switch slid up
Smooth recording cannot be made and overlap operation may not function correctly. For smooth recording or overlap operation, search the point where the insert should begin with the EDITSEARCH button and then start recording or overlap operation.

Notes on ZERO MEM mode
ZERO MEM mode is cancelled automatically in the following cases.
- When an insert recording is completed.
- When the position of the POWER switch is changed.
- When the position of the COUNTER mode select switch is changed.
- When the power is turned off.
- When the cassette is ejected.

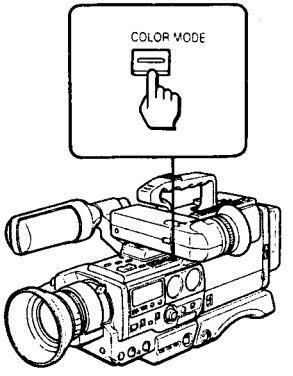
To restore it, press the ZERO MEM button again.

Notes
- When recording pause mode lasts for approximately 5 minutes, pause mode will be automatically released and the unit will be turned off.
- When the inserted tape is played back, the picture may be distorted at the end of the inserted programme.

(J-1)



(J-2)



Recording a Title

Before recording, store a title or figure. The stored title or figure is superimposed onto the picture being recorded. **(J-1)**
- Two kinds of titles or figures can be stored.
- The colour of the title or figure can be selected from 8 colours.

Make sure that the lithium battery is installed. See page 22.

Preparations

To make a desired title card
- Use a white and plane card and draw the title on it with a deep colour (black is recommended for the best result) in thick letters.
  If contrast is clear, a signboard can be stored like the title card.
- When deciding the title size, check the effective picture size on your video monitor.

Before storing a title
- Fix the title card and the video camera recorder.
- Use of an appropriate light is recommended for a better result.

Function of the COLOR/MODE button

This button is used to select the title colour or title mode. **(J-2)**

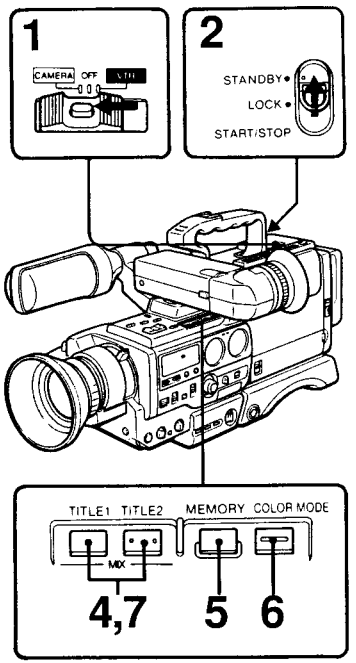
To select the colour
1 Press the TITLE 1 or TITLE 2 button to display the title.
2 Press COLOR/MODE.
  Each time the button is pressed, the colour indication changes as follows.

WHT (white) → BLUE → GRN (green) → CYAN
↑ ↓
BLK (black) ← YEL (yellow) ← VIO (violet) ← RED

To select the title mode
1 If the title is displayed, press the TITLE 1 or TITLE 2 button to clear the title.
2 Press COLOR/MODE.
  Each time the button is pressed, the mode indication in the viewfinder changes as follows.

↑: Scroll up the title.
↓: Scroll down the title.
▯: Reverse the title.
▯↑: Reverse the title and scroll it up.
▯↓: Reverse the title and scroll it down.

(J-3)



To Store the Title

(J-3)

1 While pressing the small button, set the POWER switch to CAMERA.
2 Slide up the STANDBY switch to set the unit in the recording pause mode.
3 Point the camera to the title card and adjust the focus.
4 Press the TITLE 1 or 2 button.
5 Press the MEMORY button to memorize the title.
6 Select the title colour while observing the colour indication in the viewfinder. Each push of the COLOR/MODE button cyclically changes the colour, as follows:

WHT (white) → BLUE → GRN (green) → CYAN
↑ ↓
BLK (black) ← YEL (yellow) ← VIO (violet) ← RED

7 Press the TITLE 1 or 2 button (pressed in step 4) to turn off the title.

Notes

- The colour indication in the viewfinder is not recorded on the tapes.
- You can change the title colour even after starting the recording.

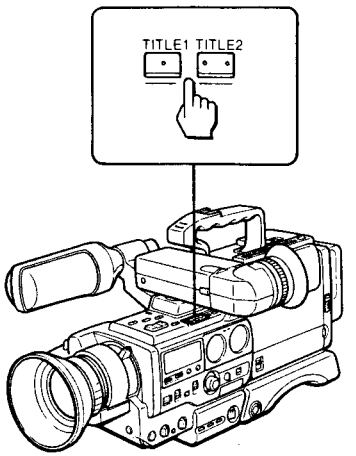
To check the title

To check the memorized title, press the TITLE 1 or 2 button. To turn off the title, press the button again.

To store a new title to the TITLE 1 or TITLE 2 button

Repeat steps 1 to 7. A new title is stored and the previous title will be deleted from that button.

(J-4)



To Record One Title

(J-4)

1 During recording, press the TITLE 1 or 2 button at the point from which you want to use the title.
The title is displayed and the title will recorded onto the tape.
2 Press the same button pressed in step 1 at the point you wish to clear the title.

When recording the title at the beginning

We recommend the following method:

1 Set the camcorder in the standby mode.
2 Display the title referring to step 1 above.
3 Release the standby mode.
4 Clear the title referring to step 2 above.

Note

When storing a title in the memory

When a cassette is installed, the camcorder will return to the power off mode after 5 minutes. Take out the cassette if more than 5 minutes will be needed to store the title.

To Layer One Title Over the Other

The title stored in the TITLE 1 button and the TITLE 2 button can be recorded at the same time with one title layered on the other.

Example: When a blue heart is stored in the TITLE 1 button and a white title "LOVE" is stored in the TITLE 2 button.

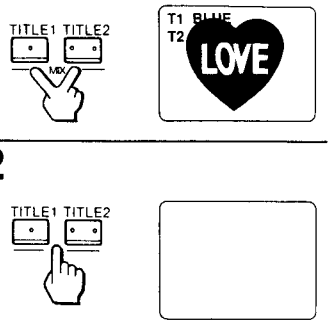
To display TITLE 1 in the background and TITLE 2 in the foreground
(J-5)

1 During recording, hold down the TITLE 1 button and press the TITLE 2 button.
2 Press the TITLE 1 or TITLE 2 button at the point you wish to clear the title.

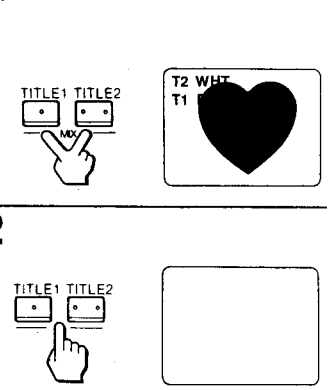
To record TITLE 2 in the background and TITLE 1 in the foreground
(J-6)

1 During recording, hold down the TITLE 2 button and press the TITLE 1 button.
In this case, TITLE 2 "LOVE" is hidden behind TITLE 1 and is not shown. Before using this function, check whether the title stored in the memory is appropriate for this application.
2 Press the TITLE 1 or TITLE 2 button at the point you wish to clear the title.

(J-5)



(J-6)



To Change the Colour of the Title after Layering One Title over the Other

Example: When a blue heart is stored in the TITLE 1 button and a white title "LOVE" is stored in the TITLE 2 button.

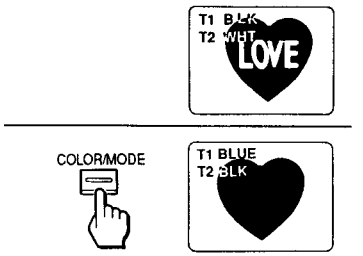
To change the colour of the title in the foreground
(J-7)

Press the COLOR/MODE button
Each press of COLOR/MODE will change the colour of "LOVE".

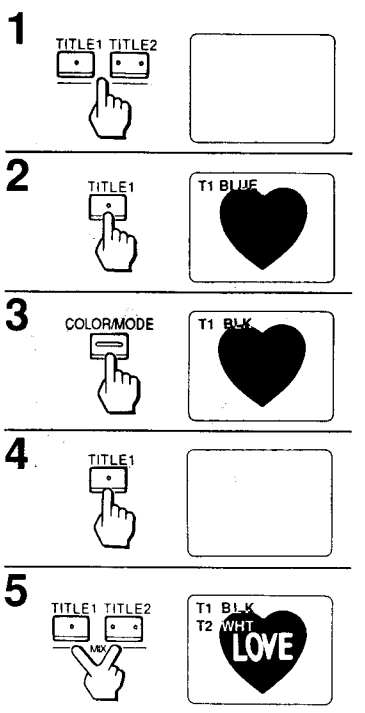
To change the colour of the title in the background
(J-8)

1 Press the TITLE 1 or TITLE 2 button to clear the title.
2 Press the TITLE 1 button.
TITLE 1, blue heart is displayed.
3 Press the COLOR/MODE button to change the colour of TITLE 1.
The colour of TITLE 1, blue heart, changes.
4 Press the TITLE 1 button.
TITLE 1, black heart, is cleared from the picture frame.
5 Hold down the TITLE 1 button and press the TITLE 2 button.

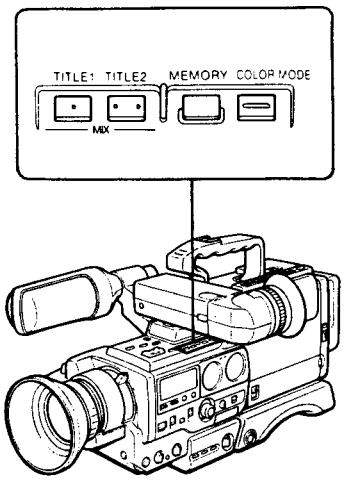
(J-7)



(J-8)



(J-9)



Various Title Display Modes

Follow the steps below to enjoy the various title display modes.

(J-9)

Step 1
During camera recording , press the COLOR/ MODE button to select the title modes. Refer to the following page for the available modes.

Step 2
Call up the title.

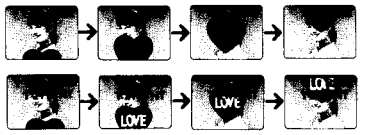
To display one title:
Press the TITLE 1 or TITLE 2 button.
To layer one title over the other:
Call up the title referring to page 56.

Step 3
Clear the title.

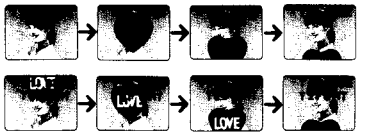
When one title is displayed:
Press the same button pressed in step 2.
When one title is layered over the other:
Press the TITLE 1 or TITLE 2 button.

(J-10)

(J-11)

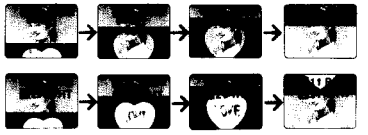


(J-12)

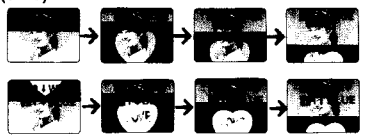


(J-13)

(J-14)



(J-15)



Title modes
Each press of the COLOR/MODE button in step 1 changes the title modes in the following order.

- **Normal title display (J-10)**

- **Scrolling up the title (J-11)**
Step 1: The ↑ indication is displayed.
Step 2: The title is scrolled upwards to the centre and stops.
Step 3: The title is scrolled up and out of the picture frame.

- **Scrolling down the title (J-12)**
Step 1: The ↓ indication is displayed.
Step 2: The title is scrolled downwards to the centre and stops.
Step 3: The title is scrolled down and out of the picture frame.

- **Reversing the title with the picture (J-13)**
Step 1: The ▯ indication is displayed.
Step 2: The reversed title is displayed.
Step 3: The title is cleared from the picture frame.

- **Scrolling up the reversed title (J-14)**
Step 1: The ▯↑ indication is displayed.
Step 2: The reversed title is scrolled upwards to the centre.
Step 3: The reversed title is scrolled up and out of the picture frame.

- **Scrolling down the reversed title (J-15)**
Step 1: The ▯↓ indication is displayed.
Step 2: The reversed title is scrolled downwards to the centre.
Step 3: The reversed title is scrolled down and out of the picture frame.

Recording a Title

To scroll up or down through the picture frame

Press the TITLE 1 or TITLE 2 button twice successively. The title does not stop on the centre, but is scrolled up or down and out of the picture frame.

When recording one title over the other

- TITLE 1 and TITLE 2 cannot be called up in the different title mode at the same time. For example, calling up TITLE 1 in the reverse mode and TITLE 2 in the scroll up mode at the same time is not possible.
- When scrolling the two titles layered, press the second title button before the first title starts to scroll.

Notes on scrolling

- You can scroll the title only when the camcorder is in the recording standby or recording mode. Only normal title display mode (no indication) and reverse title display mode (◨) can be performed during modes other than the two above. (Refer to "Playback" on page 72)
- If you can select the scroll mode first, and then set the camcorder to the modes other than the two above, the scroll mode will be cancelled automatically.

(K-1)

[a]

[b]

[c]

[d]

[e]

[f]

Digital Picture Operation

Viewing Digital Pictures

The digital picture function performs digital image processing of the recording or playback pictures and displays them on the screen with various effects.

Digital Pictures Viewed with this Unit

(K-1)

Display Page	Digital picture name	Operation		Page
		at camera recording	at playback	
[a]	**Digital still picture superimpose** A desired shaped picture can be recorded in the desired portion of the still picture.	Yes	No	63
[b]	**Overlap** The new scene appears and is recorded gradually on the last recorded scene.	Yes	No	64
[c]	**Digital zoom** The center portion of the picture is zoomed up twice.	Yes	Yes	65
[d]	**Picture in still** a small picture is displayed in the lower right position of the still picture and a new scene can be recorded there or the playback picture can be viewed.	Yes	Yes	66
[e]	**Strobe** The moving white object is viewed with the after-image.	Yes	Yes	67
[f]	**Solarization** A picture with a solarization effect can be viewed.	Yes	Yes	67

to be continued

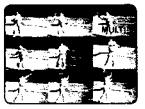
(K-2)

[g]

[h]

[i]

[j]



(K-2)

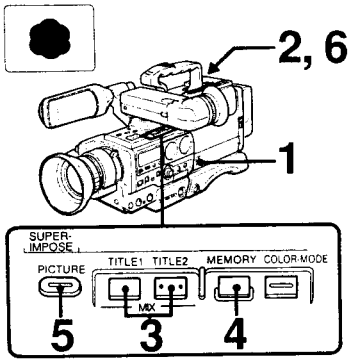
Display	Digital picture name	Operation		Page
		at camera recording	at playback	
[g]	**Noise reduction** A picture with noise reduced can be viewed.	Yes	Yes	67
[h]	**Stop motion** A still picture can be viewed.	Yes	Yes	68
[i]	**Flash motion** The picture freezes, and after a given period of time the next still picture can be viewed.	Yes	Yes	68
[j]	**Multi-picture** 9 frame pictures can be viewed. A still picture appears up to 8 frames successively at specific intervals and the normal playback or recording is continued on the last section.	Yes	Yes	68

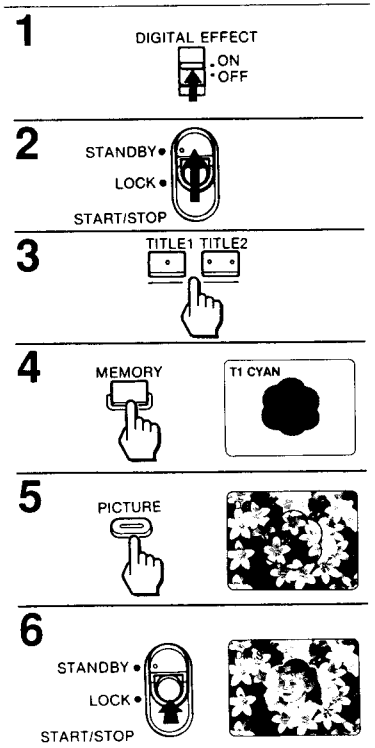
Using with the title operation
During the digital picture operation, the memorized title will be superimposed by pressing the TITLE (1 or 2) button.

Note on the digital picture
The colour may vary.

Note on DIGITAL EFFECT switch
During recording, do not change the sending of the DIGITAL EFFECT switch. The switch will not function.

(K-3)





To Record a New Scene or View the Playback Picture in the Small Picture in the Still Picture

— Digital Still Picture superimpose

The function can be operated at camera recording (At playback, it cannot be operated.)

Before operation, draw the shape of the portion in which the picture is recorded (pattern) with a deep colour in thick letters. (See "To make a desired title card" on page 53.) **(K-3)**

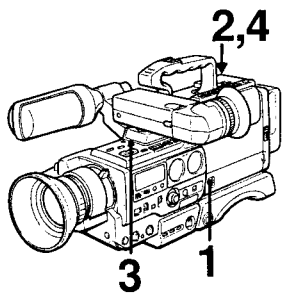
1 Set the DIGITAL EFFECT switch to ON.
2 Set the recorder in the recording pause mode.
3 Press the TITLE 1 (or 2) button.
4 Memorize the pattern.
5 Point the recorder to the subject for the still picture and press the PICTURE button. The portion except the pattern will be frozen.
6 Start recording.
The picture will be recorded in the memorized pattern.

To stop the digital still picture superimpose
Press the PICTURE button again or the CLEAR button (on the side panel). The still picture will be cleared and the normal recording will be continued.

To make the pattern
A print or signboard with strong contrast can be memorized for the pattern.
The portion of low saturation will be memorized for the pattern.
By using the title reverse function, the portion of high saturation will be memorized for the pattern.

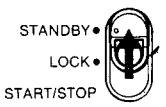
Note
- When other digital picture button is pressed, the digital still picture superimpose function will be cleared.
- When layering one title over the other, the digital still picture superimpose function cannot be operated.

(K-4)



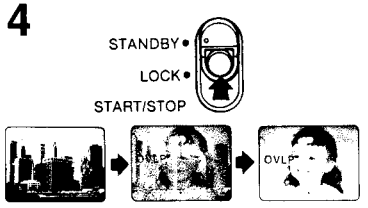
1

2



3

4



To Record a New Scene Gradually from the Last Recorded Scene

— Overlap (K-4)

This function can be operated at camera recording (At playback, it cannot be operated.)

1 Set the DIGITAL EFFECT switch to ON.
2 After recording the scene to be overlapped, set the recorder in the recording pause mode.
3 Press the FADER/OVERLAP button **twice**.
4 Start recording.

To stop the overlap before operation

Press the FADER/OVERLAP button **once**.

After the overlap is executed

The overlap function will be cleared automatically.

The OVLP indication will blink inside the viewfinder in the following cases

- The DIGITAL EFFECT switch has been set to ON during recording.
- Other digital picture button has been pressed. When the OVLP indication blinks, the overlap function cannot be used. To operate the overlap function, find the last scene with the EDITSEARCH button and then press the FADER/OVERLAP button **twice**.

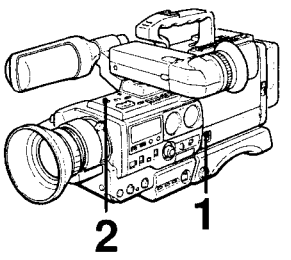
To overlap on a scene of the recorded tape

1 Set the DIGITAL EFFECT switch to ON.
2 Set the recorder in the recording pause mode by sliding the STANDBY switch up.
3 Find the last scene to be overlapped with the EDITSEARCH button.
4 Press the FADER/OVERLAP button twice.
5 Start recording.

Notes

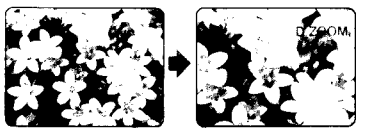
- When other digital picture button is pressed, the overlap function will be cleared.
- When the START/STOP button is pressed, the picture may be disturbed momentarily. This is not a failure of the unit.

(K-5)



1

2



To Zoom up the Center Portion of the Picture Twice

— Digital Zoom (K-5)

To zoom up during recording

Set the POWER switch to CAMERA.

1 Set the DIGITAL EFFECT switch to ON.
2 During recording, press the DIGITAL ZOOM button at the point where you zoom up the subject.

To zoom up during playback

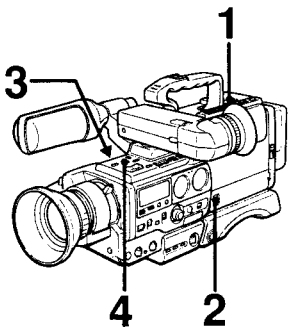
1 Set the POWER switch to VTR and play back the tape.
2 Set the DIGITAL EFFECT switch to ON.
3 During playback, press the DIGITAL ZOOM button at the point of the subject where you want to zoom up.

When the picture which is zoomed up twice at camera recording is zoomed up twice by pressing the ZOOM button at playback, you can view the picture four times as large as that of the real subject.

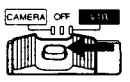
To stop the digital zoom

Press the DIGITAL ZOOM button again or the CLEAR button (on the side panel).

(K-6)

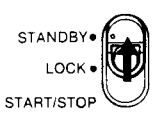


1

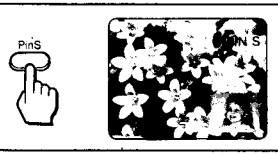


2

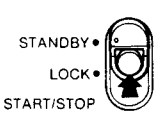
3



4



5



To Record a Desired Shaped Picture in the Desired Portion of the Still Picture

— Picture in Still

To record a small new scene in the still picture (K-6)

1 Set the POWER switch to CAMERA.
2 Set the DIGITAL EFFECT switch to ON.
3 Set the recorder in the recording pause mode.
4 Point the camera towards the subject which you want to make in the still picture and press the P in S button.
The small picture will appear in the lower right position of the still picture.
5 Start recording.
The new scene will be recorded in the small picture.

To view the small playback picture in the still picture.

1 Set the POWER switch to VTR and play back the tape.
2 Press the P in S button in the desired scene.
The scene when the P in S button is pressed will be frozen and the following scene will be viewed in the small picture.

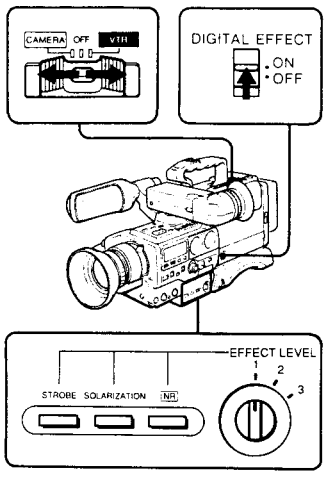
To stop the picture in still

Press the P in S button again or the CLEAR button (on the side panel). The small picture will be cleared and normal playback will be continued.

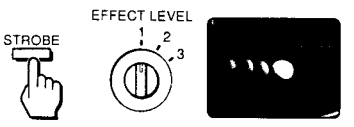
Note

When other digital picture button is pressed, the picture in still function will be released.

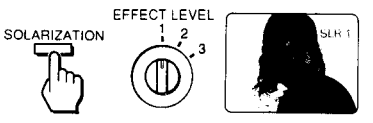
(K-7)



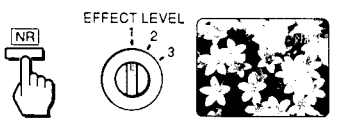
(K-8)



(K-9)



(K-10)



Strobe/Solarization/Noise Reduction

(K-7)

This function can be operated at camera recording and at playback.
Set the POWER switch to CAMERA or VTR and set the DIGITAL EFFECT switch to ON.

To record or play back the moving white object with the after-image — Strobe (K-8)
Press the STROBE button.

The level of the strobe effect can be changed with the EFFECT LEVEL control.
When the EFFECT LEVEL control is set to 3, the level is increased to the maximum.

To record or play back a picture with a solarization effect — Solarization (K-9)
Press the SOLARIZATION button.

The level of the solarization effect can be changed with the EFFECT LEVEL control. When the EFFECT LEVEL control is set to 3, the level is increased to the maximum.

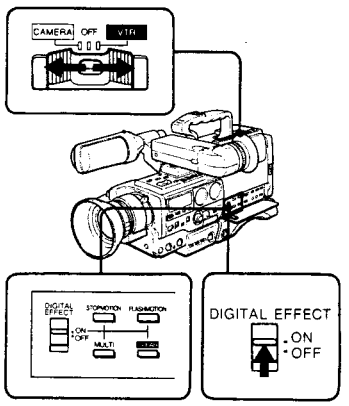
To record or play back a picture with noise reduced — Noise Reduction (K-10)
Press the NR button.

Set the EFFECT LEVEL control to change the effect.

Viewing Digital Pictures

Stop Motion/Flash Motion/Multi-Picture

(K-11)



This function can be operated at camera recording and the playback.
Set the POWER switch to CAMERA or VTR and set the DIGITAL EFFECT switch to ON. **(K-11)**

To freeze a picture — Stop Motion
Press the STOPMOTION button. **(K-12)**

To record or play back still pictures successively at specific intervals — Flash Motion
Press the FLASHMOTION button. **(K-13)**

By pressing the FLASHMOTION button, the intervals at which the still picture is switched are changed.

To record or play back 9 frames picture on the screen — Multi-Picture
Press the MULTI button. **(K-14)**

To stop the digital picture (K-15)
Press the CLEAR button (on the side panel).

When other digital picture button is pressed, the function of the pressed button will work.

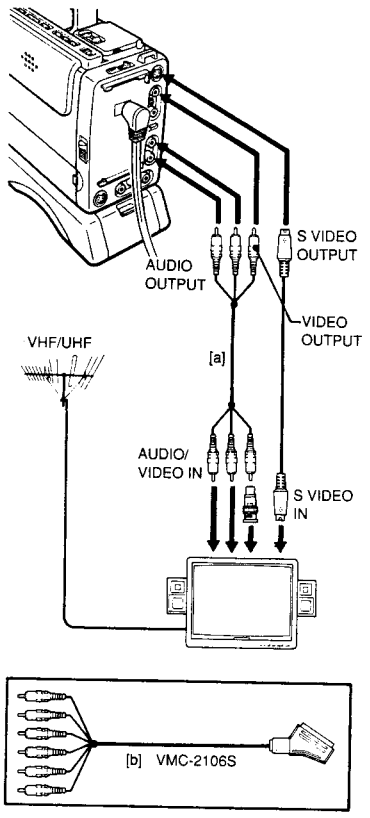
(K-12)

(K-13)

(K-14)

(K-15)

(L-1)



VTR Operation

Preparation for Playback

When the VTR is connected to the TV, refer to the pages 82 to 84.

Connecting a TV (or colour monitor) equipped with audio/video input connectors

(L-1)

Leave the TV aerial cable connected to the TV.

1 Connect the CCD-V6000E to the TV using the supplied or an optional audio/video cable to match the connectors on the TV.
   [a] Supplied cable: to phono and BNC-type connectors
   [b] Commercially available connecting cable like Sony VMC-2106S: to a 21-pin connector (EUROCONNECTOR)
   When a TV is equipped with the S VIDEO input connector, connect the S VIDEO OUTPUT to the S video input with the supplied connecting cable with the S connectors.
2 Set the TV/VIDEO selector button on the TV to VIDEO.

Connecting a TV without audio/ video input connectors

Use an RFU adaptor(not supplied).
For the type of the RFU adaptor to be used for your TV system and details about the RFU adaptor, consult your Sony service facilities.

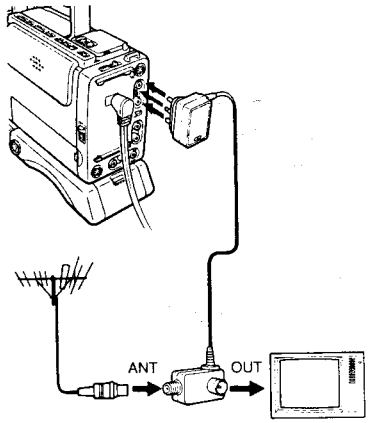
For the customers using the RFU adaptor without an aerial selector (L-2)
Connect the RFU adaptor, CCD-V6000E, the aerial and TV as shown in the illustration. Then adjust one of the TV programme positions to receive the signal from the video camera recorder and select the same programme position on the TV.

When you watch a TV programme
Turn off the camcorder or disconnect the RFU adaptor from the camcorder.

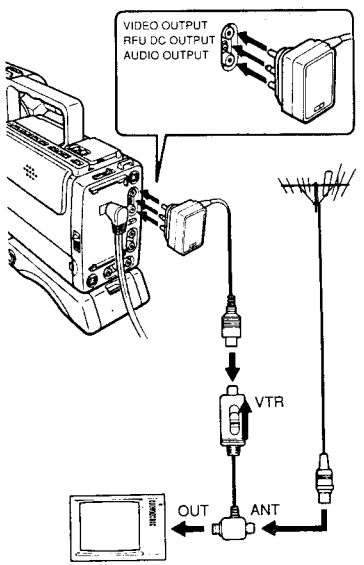
For the customers using the RFU adaptor with an aerial selector (L-3)
Connect the RFU adaptor, the aerial selector, CCD-V6000E, the aerial and TV as shown in the illustration. Then adjust one of the TV programme positions to receive the signal from the video camera recorder. Then set the selector switch on the aerial selector to VTR and select the same programme position on the TV.

When you watch a TV programme
Set the selector switch on the aerial selector to TV.

(L-2)



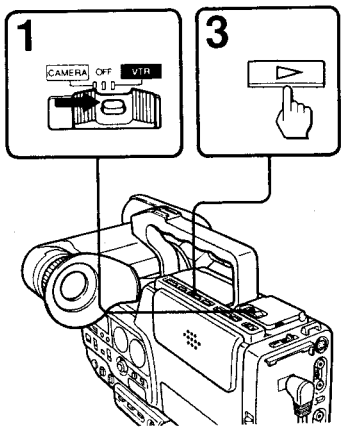
(L-3)



Playback

Turn on the TV (or colour monitor), and select the programme position for viewing a playback picture (or set the TV/VIDEO selector to VIDEO).

(L-4)



1 While pressing the small button, set the POWER switch to VTR.
2 Insert a cassette.
3 Press the ▷ button.
Playback will-start.

To stop the tape, press the □ button.

After using, be sure to set the POWER switch on the recorder to OFF.

To view a still picture (L-5)
Press the **II** button during playback. To resume playback, press the **II** button again.

(L-5)

Monitoring a High-Speed Picture

During playback — Picture search
1 In the playback mode, press the ◀◀ or ▶▶ button.
The picture will be monitored at high speed as long as it is kept pressed.
2 Release the ◀◀ or ▶▶ button at the desired point.
Normal playback will resume.

During fast-forward or rewind — Skip scan
1 Press the ▶▶ button in fast-forward mode or press the ◀◀ button in rewind mode. The picture is displayed while the button is kept pressed.
2 Release the ◀◀ or ▶▶ button to resume normal fast-forward or rewind mode.

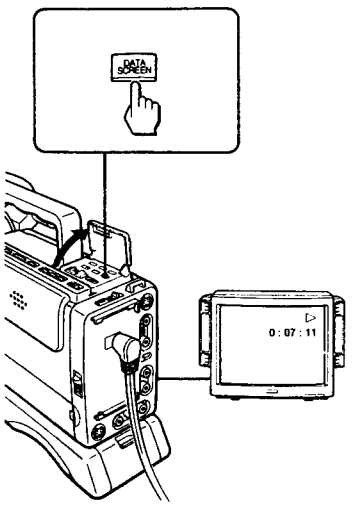
Frame-by-frame playback
Press the ▮▮► button in the still picture mode.
To resume normal playback, press the ▷ button.
Even if you press the ▮▮► button in the normal playback mode, "×1" indication appears in the viewfinder and the normal playback will continue.

Slow motion playback
Press the ▮► button in the still picture mode or playback mode. To resume normal playback, press the ▷ button.

To adjust the frame-by-frame and slow playback pictures
Press the SLOW ADJ buttons.
The adjustment can be kept memorized until the lithium battery is exhausted.

Notes
- If you move the position of the POWER switch during playback, the tape will stop. When you move the POWER switch to CAMERA in the playback pause mode, however, the unit will enter recording pause mode.
- When the pause mode lasts for 5 minutes or more, the unit will automatically enter the stop mode.
- The sound will be muted in the high-speed picture.
- When a tape is recorded in SP mode, a high-speed picture may be noisy with many streaks and become black and white. Streaks will be wider than those of an LP-recorded tape.
- When a tape is recorded in the SP mode, streaks will appear and sound will be muted in the still picture, frame-by-frame playback and slow playback modes.
- When the playback picture is viewed on another VTR or the viewfinder of this unit, adjust the picture again.
- When a tape is recorded on another VTR, adjust the playback picture, However in some cases the picture may not be adjusted.
- Noise may appear in the still picture mode.

(L-6)



To Display the Indication on the Viewfinder Screen on the TV

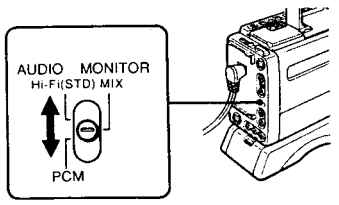
(L-6)

Press the DATA SCREEN button.
The indication on the viewfinder screen is superimposed on the TV programme. It is convenient to check the indication on the TV screen when the playback picture is viewed on the TV or when the video camera recorder is operated from a distance using the Remote Commander.

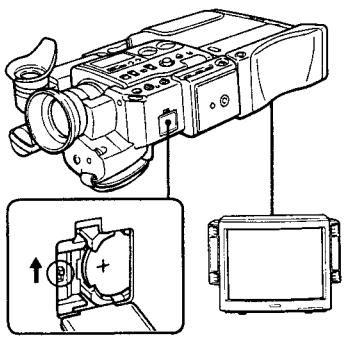
To clear the indication, press the DATA SCREEN button again.

Notes
- To edit from the CCD-V6000E to another VTR, clear the indication on the TV or the indication will be recorded with the picture.
- During playback or in the still picture mode, the data indications appear to shake.

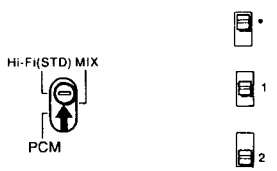
(L-7)



(L-8)



(L-9)



Selecting the Sounds to be Monitored

The sounds to be monitored can be selected by the AUDIO MONITOR switch. **(L-7)**

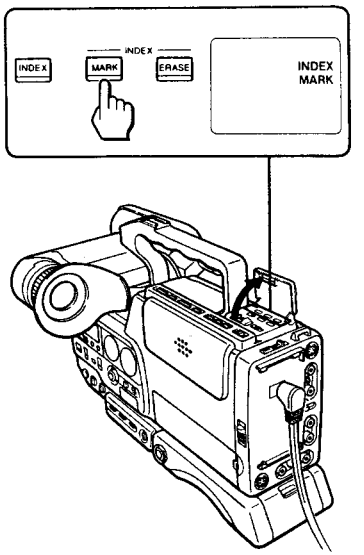
Hi-Fi (STD)	To monitor the hi-fi stereo sound recorded on the standard track
PCM	To monitor the digital stereo sound recorded on the PCM track
MIX	To monitor the hi-fi and digital stereo sounds recorded on the standard and PCM tracks

Playing back the audio dubbed tape
Set the AUDIO MONITOR switch to PCM or MIX. If the switch is set to Hi-Fi, the audio dubbed sound cannot be monitored.

Playing back the dual sound recorded tape

Normally set the hi-fi sound output select switch to "•" (upper) position. **(L-8)**
When the dual sound recorded tape is played back, set the AUDIO MONITOR switch to Hi-Fi (STD) and select the desired sound with the hi-fi sound output select switch. **(L-9)**
[a] AUDIO MONITOR switch
[b] Hi-fi sound output select switch

(M-1)



To Mark Index Signals during Playback

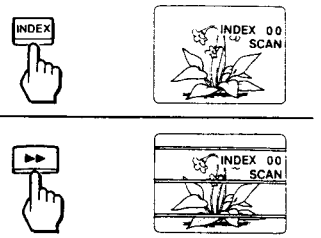
The desired programmes can be easily located by the index signals marked on the tape.
Press the MARK button at any desired point on the tape during playback. **(M-1)**

When the index signal is marked in the playback pause mode, the index signal will be marked just after the playback pause mode is released.

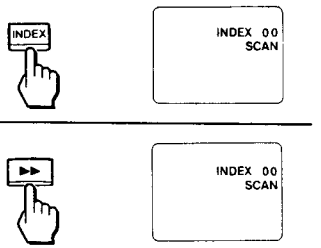
Notes on marking the index signals
- The index signals can be marked at any desired point. Make sure there is more than 2 minutes of space between two index signals. If there is more than one index signal marked within an interval of 2 minutes at the normal tape speed, the unit may not function properly.
- The recorded sound cannot be heard and a black bar appears at the bottom of the playback picture while the index signal is being marked during playback. However, the recorded signals are not affected.
- The index signals cannot be registered on a cassette tape whose safety tab is slid out.

If an index signal is marked on a tape with the data code recorded
The camcorder erases the data code and marks the index signal instead. If you play back the portion of the tape on which the data code has been erased, the camcorder keeps displaying the data code immediately before the erased one. If the data code does not exist for more than 30 seconds, the data code display will then change to "– – – –" (bars).

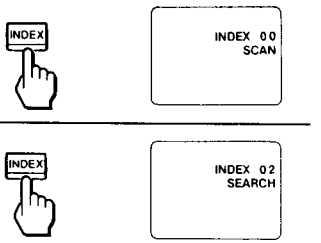
(M-2)



(M-3)



(M-4)



To Scan or Search the Programme during Playback

To scan the beginning of each programme during monitoring the picture – Index scan (1) (M-2)

1 Press the INDEX button in the playback or playback pause mode.
2 Press the ◀◀ or ▶▶ button.
The tape is played back for approximately 10 seconds at the point where the index signal is marked.
3 To continue playback, press the ▷ button.
When no button is pressed, the picture is automatically scanned to the next or previous programme.

To scan the beginning of each programme in sequence – Index scan (2) (M-3)

1 Press the INDEX button in the stop mode.
2 Press the ◀◀ or ▶▶ button.
The tape is played back for approximately 10 seconds at the point where the index signal is marked.
3 Press the ▷ button to continue playing back the desired picture.

When no button is pressed, the picture is automatically scanned to the next or previous programme.

To locate the desired programme – Index search (M-4)

1 Press the INDEX button in the stop or playback mode.
2 Press the INDEX button again until the index number of the desired programme is displayed on the viewfinder screen.
3 Press the ◀◀ or ▶▶ button.
The playback is started at the beginning of the designated picture.

To correct the index number

Press the □ button and repeat the above steps.

(M-5)

To Erase Index Signals

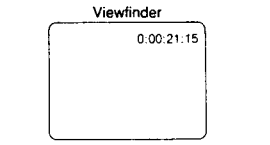
(M-5)

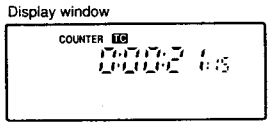
1 Play back the beginning of the picture to be erased by index scan or index search.
2 Within approximately 10 seconds, while the tape is being played back, press the ERASE button.
When the index signal is erased while index scanning, the index scan is resumed.
When the index signal is erased while index searching, normal playback is begun.

Notes on erasing the index signal

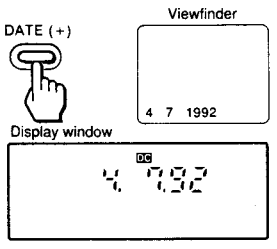
- Press the ERASE button more than 2 seconds after the playback starts.
- If the safety tab on the cassette is slid out, the index signal cannot be erased.
- While an index signal is being erased, the recorded sound cannot be heard and a black bar appears at the bottom of the playback picture.
However, recorded signals are not affected.
- The index signal marked by a VTR such as the EV-S1000E series can be detected with this unit but cannot be erased.
The index signal marked by this unit can be detected with a VTR such as the EV-S1000E series but cannot be erased.
- When the audio is dubbed in the portion where the index signal is marked, the index signal may be erased.
- While an index signal is erased, the RC time code and data code on the same portion of the tape are erased as well. The "– – – –" (bar) indication will appear when that portion is played back.
To use that tape for editing using an editing controller, rewrite the RC time code referring to page 80.

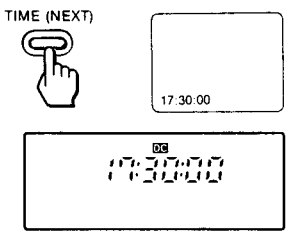
(N-1)





(N-2)





Displaying the RC Time Code/Data Code

The RC time code and data code (recording date and time) recorded on a tape can be displayed in the viewfinder and display window during playback. You can easily locate the desired tape programme by observing the RC time code and data code.
You can also duplicate the RC time code on another tape while they are displayed.

To Display the RC Time Code

(N-1)

Set the COUNTER mode select switch to TIME CODE.
The TC indication appears in the display window and the RC time code is displayed in the viewfinder and display window.
The frame digits are displayed only in the viewfinder.

To display the RC time code on the TV screen
Press the DATA SCREEN button.

To Display the Data Code

(N-2)

1 Set the POWER switch to VTR.
2 Press the DATE button to display the date, or the TIME button to display the time.
The DC indication appears in the display window with the date or time.

To clear the data code indication
Press the same button again.

To display the data code on the TV screen
- During normal or various mode playback, simply press the DATE or TIME button.
- In stop, fast-forward or rewind mode, first press the DATA SCREEN button and then press the DATE or TIME button.
- Data code can be displayed only when the POWER switch is set to VTR.

Notes on the data code
- The data code cannot be displayed when the POWER switch is set to CAMERA or OFF.

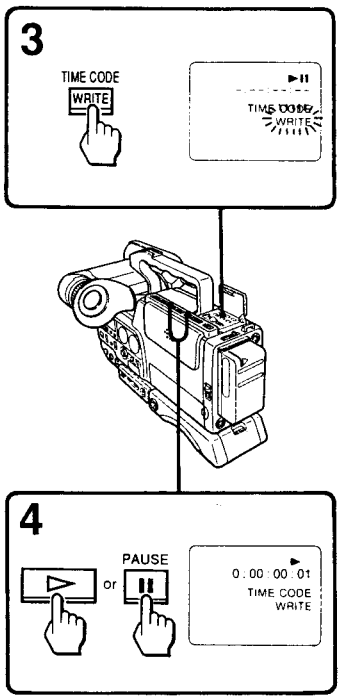
When bars (– – – –) may appear in place of the RC time code or data code indication
- A blank portion of the tape is played back.
- The data code on the tape is illegible due to tape damage or noise.
- The current date and time are not set.
- The tape is in fast-forward or rewind mode.
- The camcorder is in frame recording mode.

When the remote control unit provided with the counter display is connected
The counter indicatin on the remote control unit can be switched to the RC time code indication by setting the COUNTER mode to TIME CODE on this camcorder. In this case, "F:FF:FF" indication may appear on certain units. This is not a failure of the camcorder of the remote control unit.

Note
While dubbing an audio signal on the PCM track, bars (– – – –) appear in place of the RC time code or data code indication.

Writing the RC Time Code on a Prerecorded Tape

(O)



You can write the RC time code on a tape without affecting the prerecorded picture and sound.

To Write the RC Time Code from the Beginning of the Tape

(O)

1 Rewind the tape to the beginning.
2 Set the camcorder to the playback pause mode.
3 Press the TIME CODE WRITE button.
The TIME CODE WRITE indication appears in the viewfinder with WRITE flashing.
4 Press the ▷ button or the II button to start playback.
The WRITE indication stops flashing and the RC time code writing starts from 0:00:00:00.

To stop the RC time code writing
Press the □ button (or another tape transport button).

To Write the RC Time Code from the End of the RC time Code Prerecorded Portion

Rewind the tape up to the portion on which the RC time code has been written, and follow steps 2 to 4 of " To Write the RC Time Code from the Beginning of the Tape". The RC time code is written continuously.

To Use the Video Editing Controller

To edit a tape using the RC time code, you can use the video editing controller RM-E500 or RM-E700 by connecting the REMOTE connector on this unit to the ⇵ connector on the editing controller. The RC time code recorded with this camcorder are output from the ⇵ REMOTE connector.
While the CCD-V6000E is connected, the double speed playback mode and the reverse frame-by-frame playback mode do not function on the RM-E500 or RM-E700.
When using the RM-E500 or RM-E700 in the shuttle mode B, you can set the CCD-V6000E only to the normal speed reverse playback mode and the fast-reverse playback (review) mode by turning the shuttle dial to the reverse direction, and to the normal speed reverse playback mode by turning the jog dial to the reverse direction.
For details on connection and operation, refer to the manual of the video editing controller.

Note
The RC time code and data code recorded with this camcorder are not output from the S VIDEO connector or VIDEO jack.

Notes on RC time code writing
- If you start RC time code writing from the portion on the tape without a time code, the time code is written from 0:00:00:00 even when the tape is not at its beginning.
- By writing the RC time code, the data code and the index signals recorded on the tape are erased.
- If the RC time code writing is performed on a blank portion of a tape, the time code is written correctly, although the screen is noisy.
- If you intend to write the RC time code from the middle of a tape without a time code, writing starts several frames before the current picture.

The RC time code writing is cancelled when:
- you press the TIME CODE WRITE button again in the playback pause mode.
- you press the INDEX button on the Commander in the playback pause mode.
- you change the playback mode to another mode.

TV Programme Recording

The following connections make both TV programme viewing/recording and tape playback possible.

Combination of the Equipment to be Used

Connection example 1 (page 83)
To connect the VTR with an input selector

Connection example 2 (page 84)
To connect the VTR without input selector.

Connecting Cables

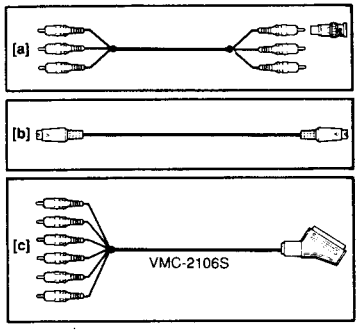
(P-1)

- For aerial connections, use 75-ohm coaxial cables.
- For video/audio connection, use the supplied AV cable, connecting cable with S connectors or an optional audio/video cable to match the connectors on the equipment to be connected.
  [a] Supplied AV cable: for stereo equipment
  [b] Connecting cable with S connectors
  [c] Commercially available connecting cable like Sony VMC-2106S: for a 21-pin connector (EUROCONNECTOR)

Notes

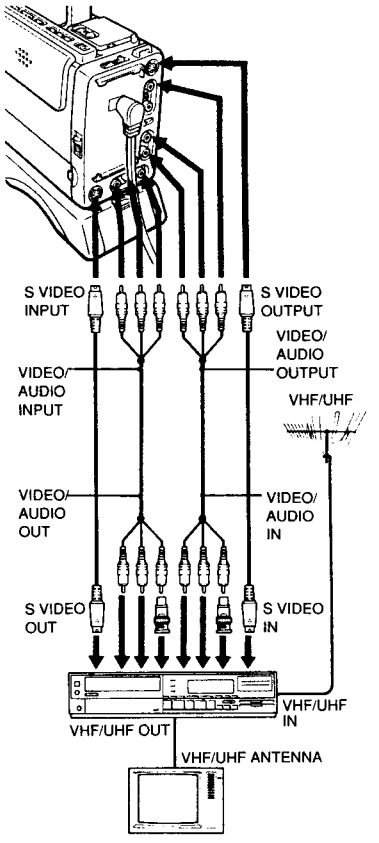
- When the conventional 8 mm cassette is used, the picture cannot be recorded in the Hi8 mode.
- For viewing the high quality picture in the Hi8 mode, We recommend to connect another equipment to the S VIDEO INPUT connector.
- When the equipment is connected to the VIDEO INPUT and S VIDEO INPUT jacks, the signals from the S VIDEO INPUT jack take precedence.
- When the equipment is connected only to the VIDEO INPUT jack, the signals cannot be output from the S VIDEO OUTPUT jack.

(P-1)



Connection Example 1

(P-2)



To connect the VTR with an input selector

Connections
Connect the equipment as shown in the illustration.
When the VTR is equipped with the S video output/input connectors, connect the S VIDEO INPUT/OUTPUT on this unit to the S video output/input with the supplied connecting cable with S connectors.

TV programme recording

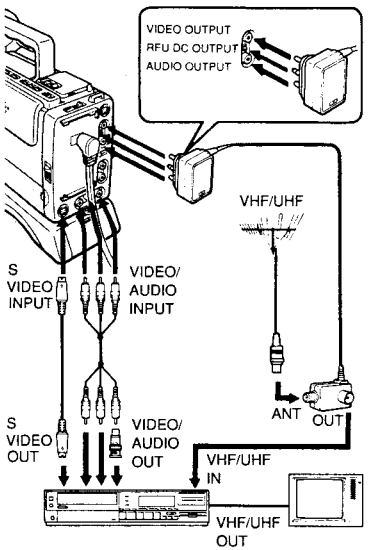
1 Turn on the VTR and TV.
2 While pressing the small button, set the POWER switch on the CCD-V6000E to VTR.
3 Select the programme position for the VTR on the TV.
4 Set the input selector to TUNER and select the TV programme to be recorded on the VTR.
5 Insert a cassette into the CCD-V6000E and slide the ● REC switch.
Recording will start.

To view another TV programme while recording
Simply select the desired programme on the TV.

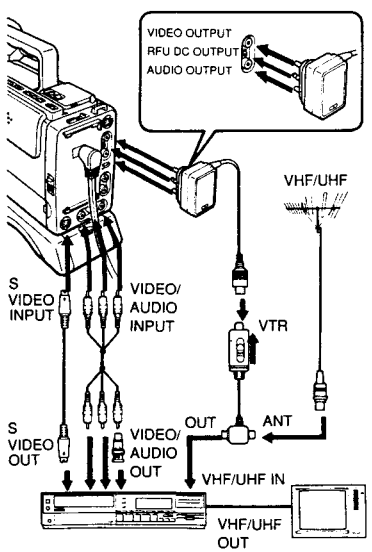
Playback

1 Turn on the VTR and TV.
2 While pressing the small button, set the POWER switch on the CCD-V6000E to VTR.
3 Set the input selector on the VTR to LINE and select the programme position for the VTR on the TV.
4 Insert a cassette into the CCD-V6000E and press the ▷ button. Playback will start.

(P-3)



(P-4)



Connection Example 2

To connect the VTR without input selector

Connect the equipment as shown in the illustration.
Use an RFU adaptor (not supplied).
For the type of the RFU adaptor to be used for your TV system and details about the RFU adaptor, consult your Sony service facilities.

For the customers using the RFU adaptor without an aerial selector (P-3)
Connect the equipment as shown in the illustration.

TV programme recording
Disconnect the RFU adaptor from the camcorder.
1 Turn on the VTR and TV.
2 Set the POWER switch on the camcorder to VTR.
3 Select the TV channel (programme) to be recorded on the VTR.
4 Insert a cassette into the camcorder and slide the ● REC switch. Recording will start.

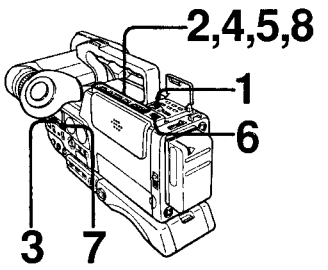
Playback
Turn on the VTR and TV. Then select the channel for the VTR on the TV. Set the POWER switch on the CCD-V6000E to VTR, and play back the recorded tape by pressing the ▷ button.

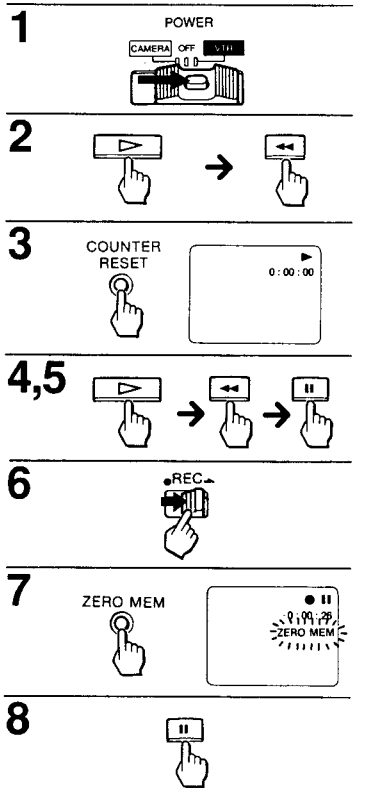
For the customers using the RFU adaptor with an aerial selector (P-4)
Connect the equipment as shown in the illustration.

TV programme recording
Set the selector switch on the aerial selector to ANT.
Then proceed above steps 1 to 4.

Playback
Turn on the VTR and TV. Set the selector switch on the aerial selector to VTR and select the programme position for the VTR on the TV. Set the POWER switch on the CCD-V6000E to VTR, and play back the recorded tape by pressing the ▷ button.

(Q)





Insert Recording

To Insert a Picture or a TV Programme from Another VTR

(Q)

Monitor the picture being inserted on the viewfinder screen.
Make sure the COUNTER mode select switch is set to NORMAL.

1 While pressing the small button, set the POWER switch to VTR.
2 Locate the point on the tape where the insert should end by pressing the ◀◀ or ▶▶ button during playback.
3 Display the counter in the display window and press the COUNTER RESET button. The counter is reset to zero.
4 Press the ◀◀ button during playback to rewind the tape a little further than the point where the insert should begin.
5 Release the ◀◀ button to resume playback and press the II button at the insert starting point.
6 Slide the ● REC switch in the arrow direction to set the unit to recording pause mode.
7 Press the ZERO MEM button.
The insert ending point is stored in memory.
8 To start recording, press the II button.

The insert recording will stop automatically near the counter zero point.

To cancel ZERO MEM mode
Press the ZERO MEM button so that the ZERO MEM indicator disappears.

Use of the Linear Time Counter

The linear time counter in the viewfinder and the display window indicates the elapsed time of the recording or playback.
To display the counter, set the COUNTER mode select switch to NORMAL.

To Index the Whole Tape

Press the COUNTER RESET button at the beginning of the tape so that the counter shows "0:00:00". By noting the counter reading at a particular point, you can easily find that point later by referring to the tape counter.

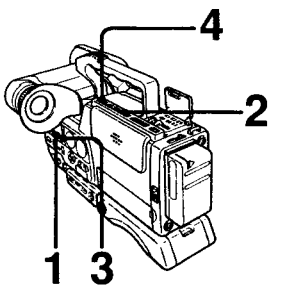
Notes on the counter

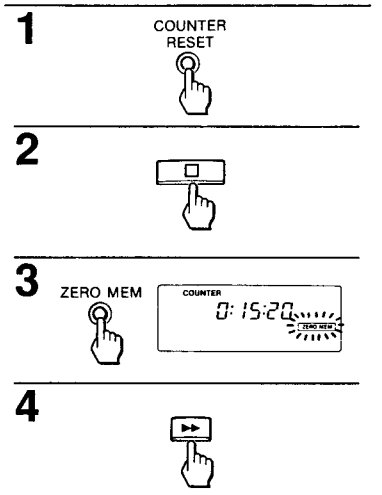
- The counter reading and the point of the tape may not correspond exactly. Use the counter as a guide.
- The counter does not operate for a blank, unrecorded portion of a tape.
- There will be a time lag of several seconds on the counter reading after repeated fast-forward and rewind operations.
- There will be also a time lag of several seconds when the tape recorded in LP and SP modes mixed or the tape having a blank portion between the recorded portions is played back.

Notes on the RC time code and the ZERO MEM functions

- The COUNTER RESET and ZERO MEM buttons are not operative when the RC time code or data code is displayed. To use the ZERO MEM function, reset the COUNTER select switch to NORMAL.(See page 85).
- If you change the COUNTER mode from NORMAL to TIME CODE when the ZERO MEM indication flashes, the ZERO MEM mode is canceled.

(R)





To Return to a Pre-registered Point

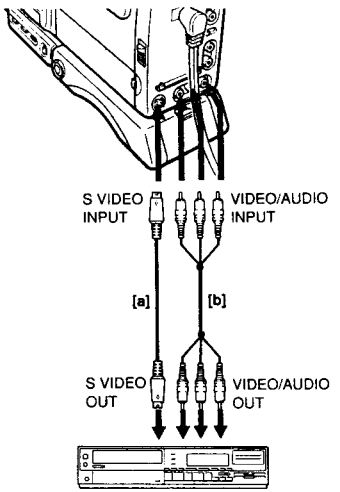
(R)

1 During recording or playback, press the COUNTER RESET button at the point you later want to locate.
2 Press the □ button when the recording or playback has finished.
3 Press the ZERO MEM button. The "ZERO MEM" indicator will flash in the display window.
4 Press the ▶▶ or ◀◀ button.
The tape will be rewound or sent forward and stop automatically when the counter reaches approximately zero.

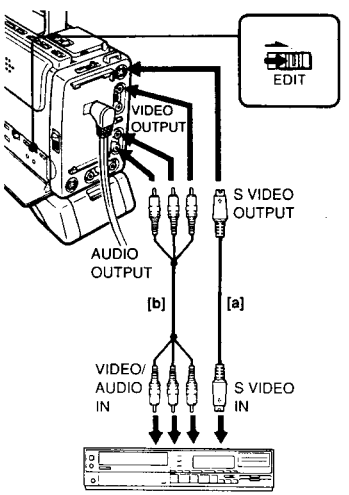
Notes on ZERO MEM button

- The ZERO MEM button does not function during recording or playback mode.
- Be sure to press the ZERO MEM button when the tape is stopped.
- The ZERO MEM mode is cancelled automatically once the tape is rewound or sent forward to zero.

(S-1)



(S-2)



Tape Editing

To edit a home movie tape, you will need another VTR or another video camera recorder.

To Edit from Another VTR

(S-1)

1 While pressing the small button, set the POWER switch on the CCD-V6000E to VTR.
2 Start playback on another VTR.
3 Slide the ● REC switch on the CCD-V6000E.

To Edit onto Another VTR

(S-2)

1 While pressing the small button, set the POWER switch on the CCD-V6000E to VTR and turn on the other VTR.
2 Slide the EDIT switch on the CCD-V6000E in the direction of the arrow.
3 Set the input selector on the VTR to LINE.
4 Press the II button on the CCD-V6000E during playback at the point where you want to start recording.
5 Press the record button on the other VTR, pressing the II button.
6 Release the II buttons on both units. Recording will start.

[a] When the VTR or video camera recorder is equipped with the S video output/input connector, connect the S VIDEO INPUT/ OUTPUT on this unit to the S video output/ input with the supplied connecting cable with S connectors.
[b] When the VTR to be used is a monaural type, use a commercially available audio/video connecting cable like Sony VMC-910MS/ 920MS.

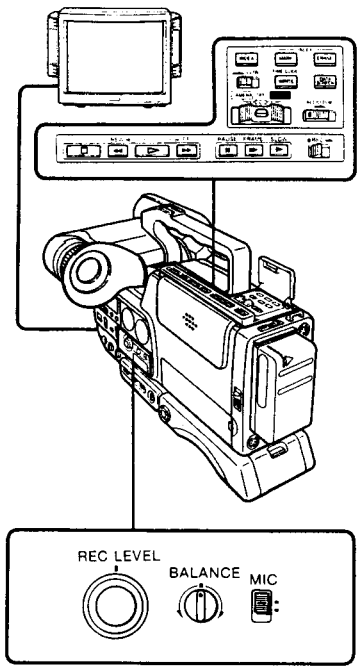
After editing, turn off both units and be sure to slide the EDIT switch in the reversed direction to the arrow.

To cut off an unnecessary portion
Press the II button on the recorder at the beginning of the unnecessary portion.
Release it where you want to resume recording.

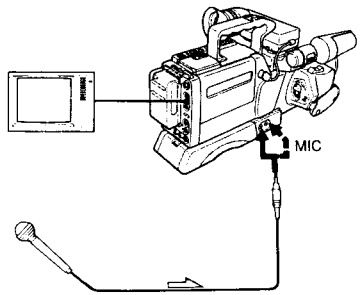
Function of the EDIT switch
Slide this switch in the direction of the arrow (ON) whenever you edit tapes. Signal loss that results from tape-to-tape transfer will be reduced, achieving more accurate signal transfer.
When recording or playing back normally, keep this switch in the reversed direction to the arrow (OFF).

Notes on the RC time code and data code
The RC time code and data code recorded with this camcorder are not output from the S VIDEO connector or VIDEO jack.

(T-1)



(T-2)



To Dub the Audio Signals

Any desired music or narration can additionally be recorded on the PCM track, while the picture and sound pre-recorded on the standard track are not affected. Monitor the picture on the TV. **(T-1)**

Example 1: To dub the signals from the microphone(s)

(T-2)

Operation

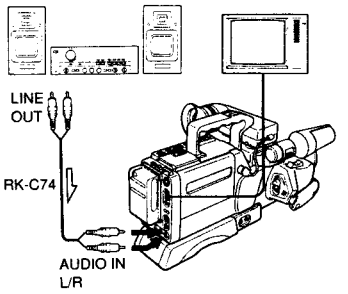
1 Turn on the power of the TV and select the programme position for the recorder or video input.
2 While pressing the small button, set the POWER switch to VTR.
3 Press the ▷ button.
4 Decide where the audio dubbing is to start, and press the ❚❚ button.
5 Slide the AUDIO DUB button in the direction of the arrow.
6 Set the MIC switch to AUTO.
The recording level will be adjusted automatically.
7 Press the ❚❚ button to release pause mode and start dubbing.

To adjust the recording level manually
Set the MIC switch to MANU in step 6 and adjust the volume and balance with the REC LEVEL control and BALANCE control. (See page 35.)

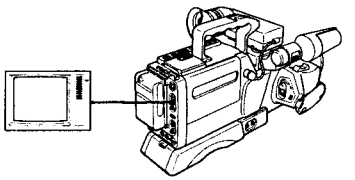
Notes

- If the microphone is connected to the MIC R jack and the POWER switch is set to VTR, noises will be recorded.
  To avoid it, connect the microphone to the MIC L jack.
- When the POWER switch is set to CAMERA and +VTR switch is slid in the direction of the arrow. The sounds from the built-in microphone will be recorded on the L channel of the PCM track.

(T-3)



(T-4)



Example 2: To dub the signals from the audio system

(T-3)

Use a commercially available audio connecting cable like Sony RK-C74.

Operation

1 Turn on the power of the TV and select the programme position for the recorder or video input.
2 While pressing the small button, set the POWER switch to VTR.
3 Press the ▷ button.
4 Decide where the audio dubbing is to start, and press the ❚❚ button.
5 Slide the AUDIO DUB button in the direction of the arrow.
6 Adjust the volume and balance with the REC LEVEL control and BALANCE control.
7 Press the ❚❚ button to release pause mode and start dubbing.

Note
When the microphones are connected to the MIC jacks, the sounds from the audio system cannot be dubbed.

Example 3: To dub the signals with the built-in stereo microphone

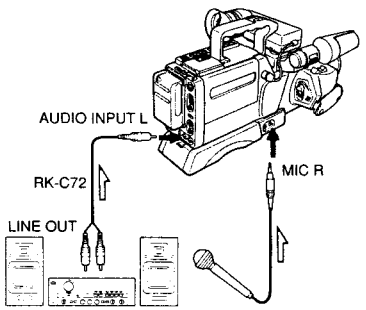
(T-4)

Operation

1 Turn on the power of the TV and select the programme position for the recorder or video input.
2 While pressing the small button, set the POWER switch to CAMERA.
3 Slide the +VTR switch in the direction of the arrow.
4 Slide the STANDBY awitch up.
5 Press the ▷ button.
6 Decide where the audio dubbing is to start, and press the ❚❚ button.
7 Slide the AUDIO DUB button in the direction of the arrow.
8 Set the MIC switch to AUTO.
The recording level will be adjusted automatically.
9 Press the ❚❚ button to release pause mode and start dubbing.

To adjust the recording level manually
Set the MIC control to MANU in step 7 and adjust the volume and balance with the REC LEVEL control and BALANCE control. (See page 35.)

(T-5)



To Dub the Audio Signals

Example 4: To dub the signals from the microphone and the audio system

(T-5)

Connect the audio system to the AUDIO INPUT L jack of this unit using a commercially available audio connecting cable like Sony RK-C72 and the microphone to the MIC R jack.

Operation

1 Turn on the power of the TV and select the programme position for the recorder or video input.
2 While pressing the small button, set the POWER switch to VTR.
3 Press the ▷ button.
4 Decide where the audio dubbing is to start, and press the **II** button.
5 Slide the AUDIO DUB button in the direction of the arrow.
6 Adjust the volume and balance of the audio system with the REC LEVEL control and BALANCE control.
7 Press the **II** button to release pause mode and start dubbing.

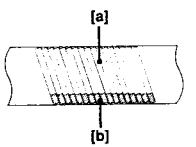
To adjust the recording level of the microphone manually
Set the MIC switch to MANU and adjust the volume and balance with the REC LEVEL control and BALANCE control. (See page 35.)

To stop dubbing momentarily
Press the **II** button.

To set the recorder in the playback pause mode after releasing the dubbing pause mode
Slide the AUDIO DUB button in the direction of the arrow.

To stop dubbing
Press the □ button.

(T-6)



To Dub the Audio Signals

When an external microphone or audio system is connected, the sound will be recorded as follows.

Track / Connection		PCM track	
		L (left) channel	R (right) channel
Ex. 1 (P.90)	L and R	external L microphone	external R microphone
	L	external L microphone	external L microphone
	R	no recorded	external R microphone
Ex. 2 (P. 91)		stereo system L	stereo system R
Ex. 4 (P. 92)		stereo system	external microphone

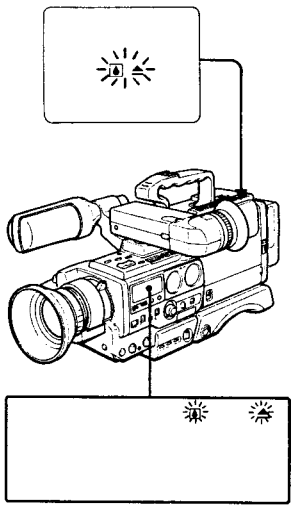
Enlarged tape (T-6)
[a] Standard track: Sounds on this track remain.
[b] PCM track: The dubbed sounds are recorded on this track.

About the picture during dubbing
- At the starting of the dubbing, upper of the picture may be distorted.
  The recording picture will not be affected.
- During dubbing or in the dubbing pause mode, a black band will appear in the screen. The recorded picture will not be affected.
- During dubbing, bars (– – – –) appear in place of the RC time code or data code indication.

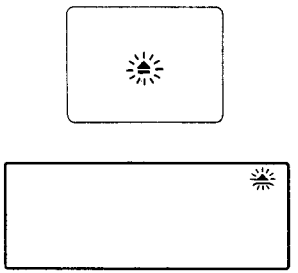
To monitor the sounds during dubbing
Set the AUDIO MONITOR switch as follows.
PCM: The sounds to be dubbed can be monitored.
MIX: The sounds only on the PCM track can be monitored.
Hi-Fi: The sounds to be dubbed **cannot** be monitored.

Notes on dubbing
- The prerecorded sounds on the PCM track will be erased by dubbing.
- The dubbed sounds cannot be played back by the VTR without the PCM recording or playback functions.

(U-1)



(U-2)



Others

Notes on Moisture Condensation

If the unit is brought directly from a cold to a warm location, moisture may condense inside the unit, on the surface or the tape or on the lens. In this condition, the tape may adhere to the head drum and be damaged or the unit may not operate correctly. To prevent possible damage under these circumstances, the unit is furnished with moisture sensors.

Moisture is Present inside the Unit When:

(U-1)

The ⚿ indication flashes inside the viewfinder or in the display window. The ⏏ indication also flashes if the cassette is present.
No function except for cassette ejection will work.

↓

Eject the cassette if present, and turn off the unit and leave it with the cassette holder open at least for one hour.

↓

The unit can be used again if the ⚿ indication does not appear when the power is turned on again.

If Moisture is Present on the Surface of the Tape

(U-2)

When the tape is inserted and a tape transport button is pressed, the ⏏ indication flashes inside the viewfinder or in the display window. No function except for cassette ejection will work.

↓

Eject the cassette and let it sit at least for one hour.
The cassette can be used again if the ⏏ indication does not appear when the cassette is inserted and a tape transport button is pressed.

If Moisture Condensation Occurs on the Lens

There are no caution indications, but the lens becomes dim. Turn off the power and leave the unit unused at least for one hour.

Precautions

Operation

- Operate the unit on 6.0 V (battery pack)/7.5 V (AC power adaptor).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Do not hold the unit by the viewfinder.
- Avoid rough handling or mechanical shock to the unit. Be particularly careful of the lens.
- Do not apply excessive force to the microphone.
- Avoid shooting the same object for a long period of time (for example, using as a lookout camera or pointing the camera directly at the sun or other bright light sources) as this will damage the colour filter inside the camera and may cause a poor picture quality.
- Remove and store video cassettes after recording or playback.
- Do not wrap up the unit and operate it because heat may build up internally.
- Avoid using and storing the recorder in the following locations.
  — Locations susceptible to vibration.
  — Locations exposed to strong magnetic fields.
  — Locations near TV or radio transmitters where strong radio waves are generated.
- **Do not let sand get into the camcorder**
  When you use the camcorder on a sandy beach or dusty place, protect it from the sand or dust. Sand or dust may cause the unit to malfunction and sometimes the malfunction cannot be repaired.
- **Do not let the camcorder get wet**
  Keep the camcorder from rain or sea water. It may cause malfunction and sometimes the malfunction cannot be repaired.

Care

- Store cassettes in their cases and keep them in an upright position to prevent intrusion of dust and uneven winding.
- When the unit will not be used for a long period of time, periodically turn on the power, operate the camera section and recorder section and play back a tape for about three minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on them, remove them with a soft cloth. Clean the recorder body with a dry, soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish. For protection, keep the lens cap on the lens when not using the camera.

Notes on Video Head Cleaning

To ensure clear picture, clean the video heads periodically.
When playback pictures are noisy or hardly visible, the video heads may be contaminated.
(U-3)
[a] Slight contamination
[b] Critical contamination
In such cases,

1 Clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied), referring to its instructions.
2 After cleaning, check if the picture is clear by recording or playing back with an ordinary tape.
3 If the picture is still noisy, repeat cleaning. (Do not repeat cleaning more than 5 times.)

Caution
Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

Note
If the V8-25CLH cleaning cassette is not available in your area, consult your Sony service facility.

(U-3)

Using Your Recorder Abroad

Each country has special TV colour broadcast and electricity systems. Before using your recorder abroad, check the following points.

Differences in colour systems
If you prepare fully charged battery packs and the AC power adaptor which can be used in all areas with the local power supply of 100V–240V, you can use your recorder in any country. You can monitor the playback picture on the viewfinder screen. However, to monitor the playback picture on a TV, the TV must be based on the PAL system and have the video/audio inputs.

PAL system countries
Australia, Austria, Belgium, China, Denmark, Finland, Germany (Former West Germany) Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, etc.

PAL-M system country
Brazil

PAL-N system countries
Argentina, Paraguay, Uruguay

NTSC system countries
Bahama Islands, Canada, Central America, Japan, Korea, Mexico, Taiwan, the Philippines, U.S.A., etc.

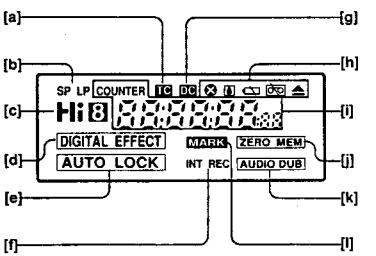
SECAM system countries
Bulgaria, France, Hungary, Iran, Iraq, Monaco, Poland, Former Soviet Union, etc.

Colour Temperature and White Balance

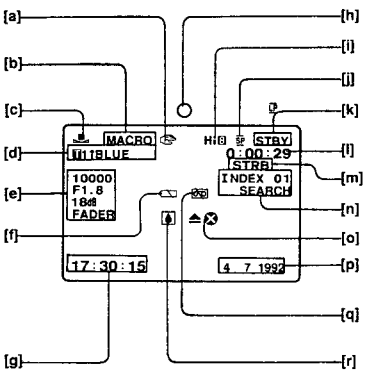
The colour temperature indicates a property of light and is measured in K (Kelvin). If increases as the light source gets bluer and decreases as the light source gets redder. It has no direct relationship with brightness.
The camcorder automatically adjusts the white balance within the range shown below.

Colour temperature (K)		Light source
↑ Blue	10.000	Clear sky
	8.000	Slightly overcast
	7.000	Cloudy rainy
	6.000	Fluorescent lamp (daylight)
↓	5.000	Direct sunlight
↑ White	4.000	Before/after 1 hr of sunrise/ sunset.
	3.500	Fluorescent lamp (off white) Studio lamp Halogen lamp
↓	3.200	
↑ Yellow	3.000	Tungsten lamp
↓	2.500	Before/after 30 min of sunrise/sunset.
↑ Red	2.000	Sunrise/sunset
↓		Candle light

(V-1)



(V-2)



Trouble Indications

Indications in the Display Window

(V-1)

[a] RC time code mode indication
[b] Tape speed indication
[c] High eight mode indication
[d] DIGITAL EFFECT indication
[e] AUTO LOCK indication
[f] Indicates during interval recording.
[g] Data code mode indication
[h] Caution indications
[i] Time/date/counter indication
[j] ZERO MEM (memory) indication
[k] Indicates during audio dubbing.
[l] Lights when the index signal is marked.

Indications inside the Viewfinder

(V-2)

[a] Manual focusing mode indication (☞)
[b] Macro mode indication (MACRO)
[c] White balance mode indication (▶, •, ☼)
[d] Title number, color, and mode indication (T1, T2, ↑, ↓ WHT, etc.)
[e] FADER/OVERLAP and manual mode indications (FADER, OVERLAP, shutter speed, iris, gain, etc.)
[f] Battery indication
[g] Data code (date or time)
[h] Camera recording/battery lamp
[i] Hi 8 mode indication (Hi8)
[j] LP mode indication
[k] Tape operation mode, camera operation mode indication (STBY, REC, etc.)
[l] Liner time counter and RC time code indication
[m] Digital picture mode indication (STRB, SLR, NR)
[n] Index operation and zero memory mode indication (INDEX MARK, SCAN, SEARCH, etc.)
[o] Caution indication(⏏, ⊗)
[p] Date
[q] Tape indication (📼)
[r] Dew indication (💧)